ELECTRICAL WEST

WITH WHICH IS CONSOLIDATED THE JOURNAL OF ELECTRICITY

McGraw-Hill Co. of Calif. SEPTEMBER 1, 1932 Twenty-five Cents per Copy

"What they say"

about NATIONAL "FIRE STOP" WIRE

1 Will not carry fire
2 Preserves rubber
3 Never soft - gummy - sticky
4 Saves labor-fishes easier
5 Strips freely - Clean copper
6 Fast colors - may be washed
7 Will not absorb moisture
8 Braids will not strip back
9 Costs no more

FIRE STOP WIRES & CABLES

NATIONAL ELECTRIC PRODUCTS

Subsidiary of Phelps Dodge Corporation

National Electric Products Corporation
Pittsburgh, Pa.

Pacific Coast Sales Offices

Reports from Utility Companies Prove that FRIGIDAIRE is

Easier to sell

Right now, today, wherever sound merchandising plans are followed, Public Utility Companies are *selling more Frigidaires.* Records prove it. For example, one company sold 25% *more Frigidaires* the first six months of 1932 than in the same period of last year. And its 1931 business was considered satisfactory. Another company has sold 50% more units this year than in the same period last year. Many others show increases of varying amounts.

This proves that people DO respond to real value. And they find it in Frigidaire—*Super Powered* with *two* cylinders instead of *one*—advanced improvements and conveniences—*lowest prices* in Frigidaire history. And back of all this—the name and reputation of General Motors Corporation. So it's not surprising that there are more than 2,250,000 Frigidaires now in use—*a million more than any other make.*

And because it is a product of *known value*—one which is "easier to sell"—it ideally meets the need for increasing the domestic load, so vitally important today. Furthermore, it has the sales possibilities which will enable you to make an important contribution to the speedy return of general prosperity.

May we not give you more of the facts—explain how we cooperate by furnishing individualized sales promotion campaigns? We'll welcome your inquiries. Frigidaire Corporation, Dayton, Ohio.

FRIGIDAIRE

A GENERAL MOTORS VALUE

ELECTRICAL WEST, entered as second class matter at the post office at San Francisco, under the Act of Congress, March 3, 1879. Published at 883 Mission Street, San Francisco, California, thirteen times a year as follows: January 1, February 1, March 1, April 1, May 1, May 15, June 1, July 1, August 1, September 1, October 1, November 1, and December 1.

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GENERAL CABLE

ANNOUNCES

THIOKOL

• TRADE MARK •

A NEW PROTECTIVE CABLE COVERING

NOT AFFECTED
BY
OILS — MOISTURE
GROUND ACIDS AND ALKALIS
SUNLIGHT — WEATHER

•

CORONA RESISTANT

•

LIGHT IN WEIGHT
EASY TO INSTALL

GENERAL CABLE CORPORATION

420 LEXINGTON AVENUE, NEW YORK CITY • OFFICES IN PRINCIPAL CITIES

A UNIFIED SERVICE OF SUPPLY

...what it can do for you this year

● The times call for economies... By providing a coordinated service of supplies, the great national distributor makes possible the kind of economies that today's conditions demand. Thanks to such a distributor, Graybar, the whole complex business of ordering, assembling and billing construction materials is simplified enormously. With an amply stocked Graybar warehouse in your vicinity, the need for expensive reserve stocks is eliminated ...These and other interesting economies are the natural result of Graybar's long experience in supplying every utility need — whether it be a pair of pliers or a trainload of poles.

GraybaR

OFFICES IN 76 PRINCIPAL CITIES.
EXECUTIVE OFFICES: GRAYBAR BLDG., N. Y.

ANACONDA
from mine to consumer
U.S. PAT. OFF.

THE MARK OF QUALITY

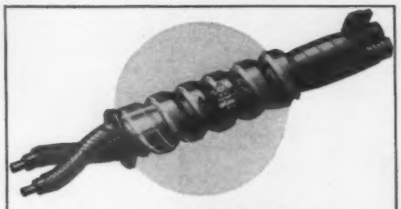
. . . for many years on Bare Copper Wire, now on Insulated Wire and other Wiring Products for every *construction use.*

• • •

Where *all-metal* wiring standards prevail, recommend these Anaconda Products:

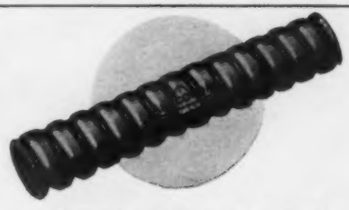
Rubber-Covered Wire

A quality product. Pulls through pipe easily. "Flame check" type furnished when required.



Armored Bushed Cable

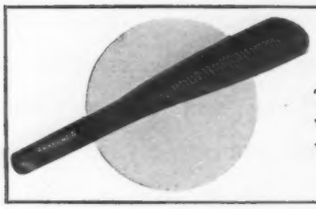
Assembled at the factory, ready to go on the job. A complete wiring system.



Flexible Steel Conduit

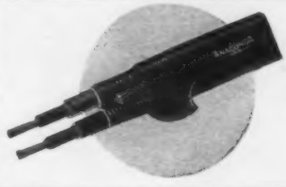
Especially flexible...and designed to protect the fished-in wires, even when bent sharply.

Where *non-metallic* wiring systems are specified, use these Anaconda Products:



Duraduct

The *original* single wall loom with the roller bearing wire-way. *Still the leader.*



Durax

Sleek-finished non-metallic sheathed cable. Quality materials throughout. Easy to strip and install.

81

In addition to these 5 popular products, the complete Anaconda line of wires and cables includes Flexible Cords . . . Antenna Wire . . . Annunciator Wire . . . Lamp Cord . . . Lead Covered Cable . . . Fixture Wire . . . and enough others to total 81 in all. Name the wires and cables that you handle . . . *we make them.*

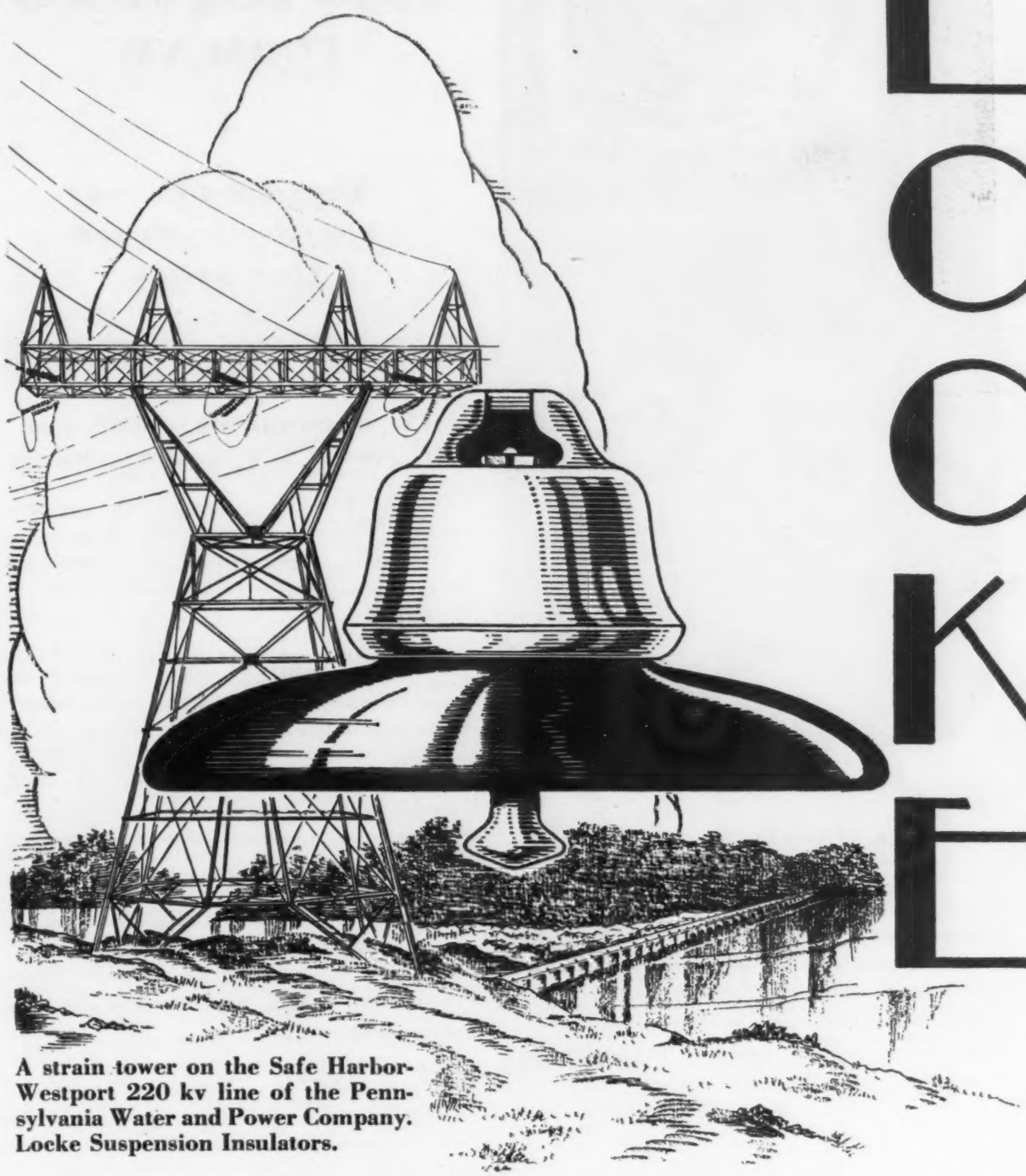
ANACONDA WIRE & CABLE COMPANY

LOS ANGELES • SAN FRANCISCO • SEATTLE

Pacific Coast Selling Agents for Bare and Weather-Proof Wire and Power Cable: General Electric Supply Corporation

Practically fifty per cent of all the Suspension Insulators used on 220 kv. systems in this country were designed and manufactured by Locke.

LOCKE



A strain tower on the Safe Harbor-Westport 220 kv line of the Pennsylvania Water and Power Company. Locke Suspension Insulators.

GENERAL ELECTRIC SUPPLY CORPORATION., PACIFIC COAST DISTRIBUTOR

The SANGAMO FORM VW

•

The Lowest-Priced Electrically-Wound Time-Switch

The outstanding features of the Form VW Time-Switch are:

ELECTRIC-WINDING . . . by a powerful, low-speed a.c. motor. During any current interruptions, the mainspring, having a 10-hour reserve, provides power for movement and contacts. Independent of frequency and voltage variations.

DEPENDABLE TIMING . . . assured by a jeweled balance, with a hairspring of special non-rusting, temperature-compensating alloy.

REVOLUTIONARY MECHANICAL CONTACT...slow-opening, small-gap. Recently introduced, but thoroughly tested in actual service before being incorporated.

FREQUENCY OF OPERATIONS . . . 3 "on" and "off" periods each day. Sunday and holiday cut-out. Manual operation without disturbing the sequence.

DUST-PROOF CASE . . . made of pressed steel, with pry-outs bottom and back.

FULLY GUARANTEED . . . by Sangamo Electric Company . . . with sales, service and engineering facilities adequate to care for any requirement. Write for literature.

THE SANGAMO ELECTRIC COMPANY

Established in 1899, the Sangamo Electric Company is today one of the leading manufacturers of electric meters. In 1924, Sangamo engineers designed an electrically-operated clock. Thousands of Sangamo clocks are now providing accurate time in homes and offices throughout the country. This is the background of experience which Sangamo brings to the manufacture of its time-switches . . . the Form VW, the Form VS and the Type T.

•

SANGAMO ELECTRIC COMPANY • SPRINGFIELD, ILLINOIS

The
SANGAMO
FORM VS

•

The New Low-Priced Synchronous Motor Time-Switch

The outstanding features of the Form VS Time-Switch are:

SYNCHRONOUS MOTOR. A slow-speed, high-torque, self-starting motor . . . powerful, sturdy, dependable . . . assures accurate operation on controlled-frequency circuits. Built for 25-, 50- and 60-cycle . . . speed 240 rpm (at 60-cycles).

DEPENDABLE TIME. The VS incorporates all the proven mechanical superiorities of the VW. The Sangamo synchronous motor insures unvarying accuracy on regulated circuits.

MECHANICAL CONTACT . . . The contact in the VS is of the same slow-acting type as that used in the VW. Thoroughly tested before being incorporated in the VW and still further *proved* in that switch.

FREQUENCY OF OPERATIONS . . . 3 "on" and 3 "off" periods, each 24 hours.

DUST-PROOF CASE . . . made of pressed steel, with pry-outs bottom and back.

INTERCHANGEABILITY OF PARTS . . . The case, contacts, dial and operating levers are interchangeable with the VW.

GUARANTEE . . . by Sangamo Electric Company . . . with sales, service and engineering facilities adequate to care for any requirement. Write for literature.

THE SANGAMO TYPE T TIME-SWITCH

In switch-control applications where the service is uncommonly severe . . . in instances where a great many "on" and "off" operations are needed . . . in cases where only the very finest switch is good enough . . . the Sangamo Type T is recommended. It has mercury-tube contacts, is independent of frequency and voltage variations, is available for a.c. or d.c. operation. Conduit-connected base, or meter-terminal base.

•

SANGAMO ELECTRIC COMPANY • SPRINGFIELD, ILLINOIS

ORANGEBURG FIBRE CONDUIT

TIME-TESTED IN 39 YEARS' SERVICE

The world's underground cables are carried by "Orangeburg"

WHEREVER electric power is used, Orangeburg Fibre Conduit has proved its ability to assure permanent, trouble-proof protection to underground cables, at low cost. Year after year Orangeburg Fibre Conduit is shipped to all parts of the world.

Whether the laborers are half-clad natives or high-grade workmen, labor costs are lower and work is done faster when Orangeburg Fibre Conduit is used.

Its light weight makes handling and placing fast and easy . . . its taper-sleeve joint sets up *tight* with a twist of the wrist . . . its smooth interior finish prevents cable damage in pulling through . . . its uniform 5- and 8-foot lengths are most economical and practical for trench laying, anywhere.

In all climates and under all soil conditions Orangeburg Fibre Conduit provides high resistance to corrosion — reduces the possibility of electrolytic or stray current damage.

Here is low-cost insurance against trouble that no underground transmission or distribution line anywhere should be without. Whether you are in Brooklyn or Bangkok, in Pittsburgh or Peking, we welcome the opportunity to offer suggestions or to prepare estimates on your conduit requirements.

The Fibre Conduit Co.

ORANGEBURG, N. Y.

THE FIBRE CONDUIT CO. REG. U.S. ORANGEBURG PAT. OFF. ORANGEBURG, N.Y.

SOLE SELLING AGENT JM PRODUCT Johns-Manville

San Francisco
159 New Montgomery St.
Los Angeles
441 Petroleum Securities Building
Seattle
743 Henry Building

A new bulletin

on Squirrel-Cage motors just off the press- - -

ASK FOR A COPY

MAIL COUPON BELOW

This new bulletin describes the following Wagner squirrel-cage motors:

Type RP1—Normal-Torque Normal-Starting-Current General Purpose Motors, 1/10 to 400 hp.

Type RP2—Normal-Torque Low-Starting-Current Across-the-Line Motors, 7½ to 30 hp.

Type RP3—Low-Torque Low-Starting-Current Across-the-Line Motors, 40 to 100 hp.

Type RP4—High-Torque Low-Starting-Current Double-Squirrel-Cage Motors, 1½ to 30 hp.

Type RP5—High-Torque Normal-Starting-Current Double-Squirrel-Cage Motors, 40 to 100 hp.

Type RP6—10% Slip (High-Torque Punch Press) Motors, ½ to 150 hp.

Type RP7—High-Torque Elevator Motors, 1 to 30 hp.

Types CP1 to CP7—Totally-Enclosed Fan-Cooled Motors, 1½ to 60 hp.

Types HP1 to HP7—Explosion-Proof Motors for Class 1 Group D Locations, 1½ to 30 hp.

Types MRP and MCP—Multi-Speed Motors—2-speed, 3-speed, and 4-speed; Constant-Torque, Constant-Horsepower, and Variable-Torque, ½ to 125 hp.

Everyone who buys, uses, specifies, sells, installs, maintains and repairs squirrel-cage motors will find this new Wagner bulletin full of interesting and helpful information. Ask for a copy. Just sign and mail the coupon. You do not obligate yourself in any way.

Wagner Electric Corporation

MOTORS TRANSFORMERS FANS BRAKES

L232-3

Wagner Electric Corporation,
6381 Plymouth Ave., St. Louis, Mo.

Gentlemen:

Please send me a copy of your new bulletin 174 Wagner Squirrel-Cage Motors, and place my name on your mailing list to receive all additional pages as soon as they are available for distribution. I understand that this request obligates me in no way whatsoever.

Name and Position _____

Firm _____

Address _____

Refrigerator Campaign *to aid*

Dealer Sales

In Rural Communities

The four cooperative advertisements shown in miniature size to the right, are being published prior to and during the State Fair in local newspapers of towns throughout Northern and Central California.

The object is to call attention of people in rural communities to the exhibit of popular-make electric refrigerators at the State Fair, September 3 to 10, inclusive. It is anticipated that attendance this year will closely approximate the number of persons, 48,000, who visited this exhibit at the State Fair last year. A majority of the prospects created by the 1931 exhibit bought from their local dealers when they returned home.

The thousands who attend this year's exhibit will return home with new or renewed interest in electric refrigerators. Now is an opportune time to let these newly created prospects know where you are. Capitalize! Put forth your best window displays, advertising, and direct mail. SELL to this ready-made market.

P·G·and E·

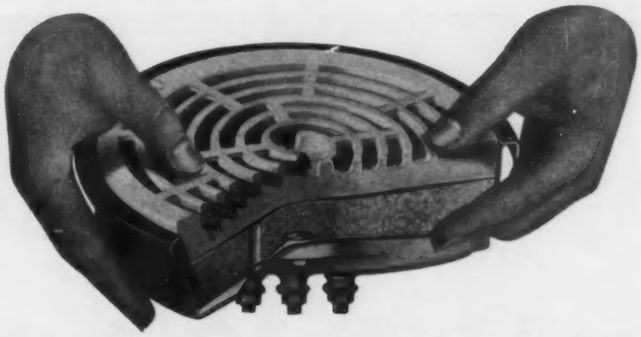
PACIFIC GAS AND ELECTRIC COMPANY

Owned · Operated · Managed by Californians

EW-109-932

Selling Electric Cookery
as an efficient, modern method

Special Designed Surface Units Overcome "Slow Expensive" Bugbear



HOW does electric cookery compare with my present method—is it slower—is it more expensive? These two questions are uppermost in the mind of the average prospective purchaser of an electric range.

These are natural questions, yet their existence offers a real opportunity for the Monarch dealer. Because, he can prove to a fair minded person, beyond all question of

doubt, that Monarch Electric Cookery is just as fast and just as economical as older methods—and provides many other outstanding advantages to the user as well.

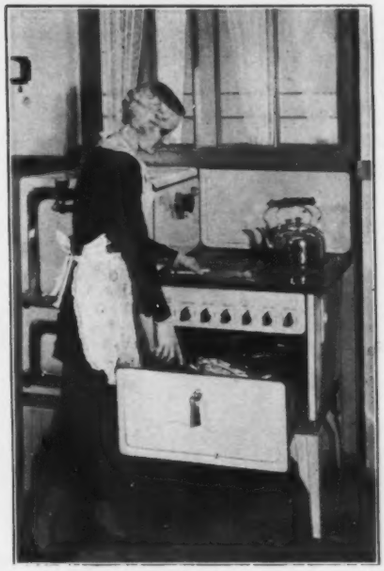
Continuous use in thousands of homes, and impartial tests in the laboratory made by disinterested experts have established the speed and remarkable economy of the Monarch Hi-Efficiency Surface Unit. Its scientific design and quality construction combines the advantages of others—the speed of the "open" type and the heat retaining properties of the "closed" unit, resulting in the utmost economy of time and of current, plus extreme durability and inexpensive replacement.

A few minutes spent in study and consideration of the many sales features of the Monarch Hi-Efficiency Surface Unit will be repaid many times over as a result of increased sales. Stress these principal points when selling a prospect:

1. Only genuine nichrome wire, which withstands a temperature of 1700F is used. Even spacing distributes heat over entire surface and eliminates "hot-spots".

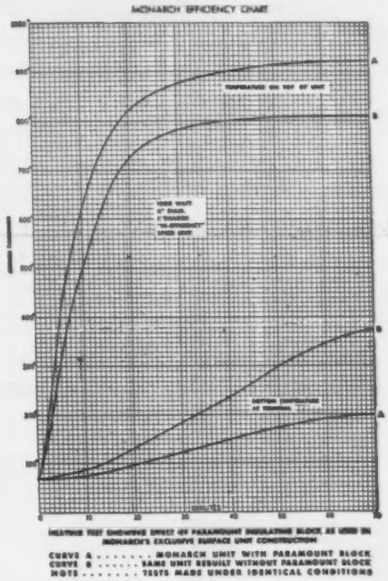
2. Element is recessed in porcelain block of special refractory clay of extreme hardness and durability. Many bridges prevent wire buckling and contacting utensils. Four slots in porcelain provide for expansion.

3. Paramount insulating block, one inch thick, underneath porcelain block, prevents downward radiation and loss of heat and stores it for use after current is shut off. Liquids in a covered utensil will continue to boil from 15 to 25 minutes, due to this exclusive construction. (Note efficiency chart in the third column.) The concave top surface of this insulating block provides a dead air space, further increasing the efficiency of the unit. This highly important feature is to be had in no other surface unit; be sure to capitalize on it.



4. Both blocks (upper porcelain and Paramount insulating blocks) are encased in a heavy pressed steel pan, porcelain enameled inside and out, attractive in appearance and easily cleaned.

5. Monarch construction provides cool terminals and freedom from corroded and burned out wires. Connections to the supply wires are outside of unit pan and away from the heat. Only three wire connections per unit.


MONARCH EFFICIENCY CHART
CURVE A ..... MONARCH UNIT WITH PARAMOUNT BLOCK
CURVE B ..... SAME UNIT REBUILT WITHOUT PARAMOUNT BLOCK
NOTE ..... TESTS MADE UNDER IDENTICAL CONDITIONS

6. Monarch units are quickly and easily removed from top for cleaning. Holes in bottom of pan provide drainage.

7. The heating wire is extremely durable, yet replacement is inexpensive—an highly important consideration.

8. Unit bricks are green to harmonize with the green marbleized, acid resisting cooking top. Stains are scarcely noticeable and the color goes all the way through the brick.

Always take plenty of time to impress the prospect thoroughly with these distinct advantages of the Monarch Hi-Efficiency Surface Unit. Point them out one by one on the cut-away demonstration sample and see how the sales resistance melts away when these exclusive features are understood.

Malleable Iron Range Co.
3116 Lake St., Beaver Dam, Wisconsin

Central Station Representatives: ..... **Chamblin-Thomas Company, 639 Mission Street, San Francisco, California**
Dealer Representative: ..... **Glenn L. Brown, 3515 Kempton Place, Oakland, California**
Northwest Representative: ..... **G. A. Lieser, 1218 17th Avenue North, Seattle, Washington**

Let this QUALITY *reputation sell lamps for you*

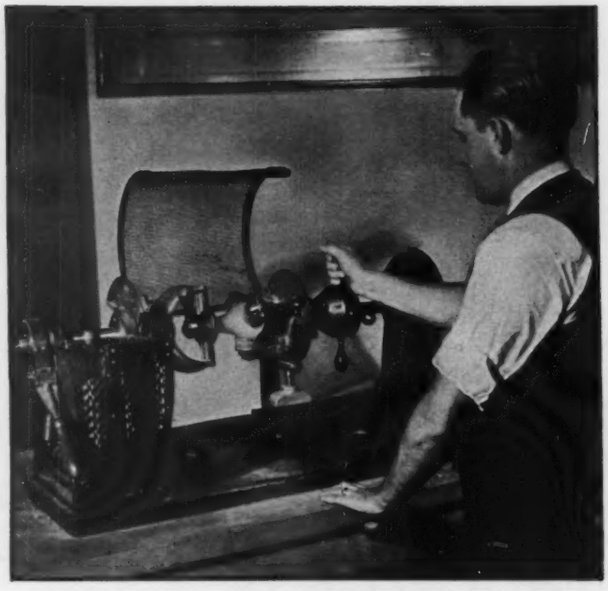
GENERAL Electric is the oldest and largest manufacturer of incandescent lamps. The name G. E. on a lamp stands for quality. Quality means more today to the seller because it means more to the buyer.

The quality significance of the G. E. monogram is not simply a tribute to the nationally famous research organizations which it maintains, nor to its precision manufacturing methods. It is not due solely to the fact that for many years lamps bearing the G. E. mark have given uniform satisfaction. It is the result of all of these facts. It has been so impressed upon the American public by extensive national advertising that people *rely implicitly* on the General Electric monogram as an unqualified pledge of electrical efficiency, economy and reliability.

And now the public is being told as never before the fundamentals that make G. E. quality—and especially, what that quality means to them in the way of getting utmost light from every dollar spent for electric current.

It is easy to grasp these outstanding facts about lamps and why people buy them.

1. People buy lamps to get light.
2. The measure of any lamp's efficiency is its lighting efficiency. Does it give the utmost light for the current consumed?
3. General Electric guards MAZDA lamp quality by 480 processes, tests and inspections. In addition, 40,000 MAZDA lamps are tested daily by the Electrical Testing Laboratories, New York, an independent organization whose technical findings are accepted as standard in the electrical industry.
4. The buyer cannot test each lamp individually for lighting efficiency. His best safeguard, therefore, is to look for the G. E. monogram on the lamp.



Testing the strength of the basing cement of a General Electric MAZDA *lamp. Rubber arms take a firm hold on the bulb, while the base is inserted in a socket. Then a twisting force is applied, several times as great as the lamp meets in normal service. Weak bases have no chance to get past this test!*

We have a limited quantity of an extraordinarily interesting, yet very concise brochure which you can read in a few minutes. It is entitled "Answering 5 Questions About General Electric MAZDA Lamps." You can have a copy by writing for it. General Electric Company, Nela Park, Cleveland, Ohio.

GENERAL ELECTRIC

MAZDA LAMPS

PARKWAY CABLE

BECAUSE it eliminates unsightly overhead construction and the expense of conduits and manholes, Roebling Steel-Armored Parkway Cable is being used in ever-increasing quantity. It is adapted for street and parkway lighting, police-fire alarm, traffic and railway signal, telephone, telegraph, and short power transmission circuits.

This cable is available in single and multiple conductor, and solid and stranded constructions. Depending upon the requirements, it is made up with or without lead sheathing under the armor, with or without metal tapes, and with various insulations including rubber, varnished cambric and paper.

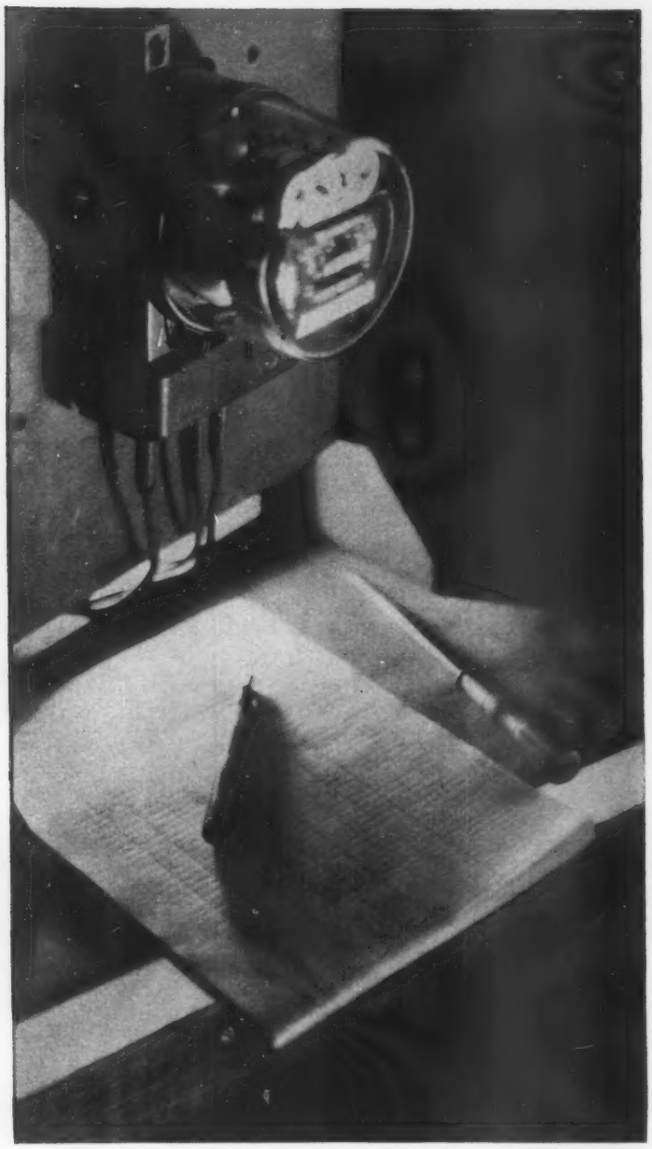
We invite your inquiry for further data.

Rubber Covered Wires and Cables : Braided and Leaded : Code; Intermediate; 30% » Power Cables : Paper; Cambric; Rubber » Submarine Cables » Tree Wire » Parkway Cable » Service Cables » Station Cables » Rubber Covered Control Cables » Slow-Burning Wires and Cables » Weatherproof Wires and Cables » Police-Fire Alarm Cable » Portable Cords » Annunciator Wire » And a wide variety of other wires and cables.

JOHN A. ROEBLING'S SONS CO. OF CALIFORNIA
San Francisco Los Angeles Seattle Portland, Ore.
Export Dept., New York

ROEBLING

LET YOUR OWN TESTS PROVE



THE NEW OC

To determine just how well suited the OC meter is for modern service conditions, subject it to starting-watt, voltage, temperature, load or other tests in your laboratories. There, it will convince you that no matter what its operating experience will be, it will register fully every load.

But excellent performance tells only part of the story. Simplified construction, fewer sizes, fewer repair parts result in marked economies, a most important consideration.

For detailed information about the OC meter, simply mail the coupon for Circular 1938 which describes fully the construction and many advantages of this new advance in the meter art.

SEND FOR BOOKLET

Westinghouse Electric & Manufacturing Company
Room 2-N--East Pittsburgh, Pa.
Gentlemen: Please send me a copy of C. 1938.

Name .....
Company .....
Address .....
City ..... State ..... E W 9-32

Westinghouse

T 31983

Quality workmanship guarantees every Westinghouse product

ELECTRICAL WEST

With which is consolidated the Journal of Electricity
McGraw-Hill Company of California

San Francisco, Sept. 1, 1932
Volume 69
Number 3

G. C. TENNEY, *Editor*

Editorial

Federal Regulation Appears Inevitable

IS SOME form of federal regulation of electric utility holding companies inevitable? Irrespective of the attitude of the light and power companies, such seems to be today's trend. Both major political parties have asserted that federal regulation is in the public interest, the Republican platform declaring for regulation of interstate power and the Democratic taking an even broader stand.

The Federal Power Commission, after an exhaustive study of hydro-electric interests licensed under the Federal Water Power Act, reports that public control of holding companies is "absolutely essential." It recommends that this public control include the "service organizations of these holding companies," with supervision of all contracts between holding companies and their operating companies, as well as "regulation of accounts, with requirements providing specifically for the filing of financial and other reports on prescribed forms for full publicity."

With this latter recommendation, William Zebina Ripley, Harvard's political economist and the severest critic of utility corporate structures, is in entire accord in an article in the August "Forum." He believes that public salvation must come from federal legislation which will "require standardization and publicity of accounts, especially of those interstate corporations which tie together local operating companies."

The indirect practices on the part of a very small minority of holding companies, practices which are responsible for the insistent demand for federal regulation, are too familiar to bear repetition. It is unfortunate that the entire holding company structure, particularly those earnest organizations which have adhered strictly to the function of raising capital to invest in generating stations, transmission lines and better service in the interest of enterprise and efficiency, should pay the penalty for the perversions of the few. The field of usefulness of the holding company is by no means exhausted. It has demonstrated that where intelligent, honest and well-meaning management has prevailed, the public has been benefited.

In the meantime, with federal regulation already on the horizon, it behooves the utilities to consider seriously the form this regulation will take and the source from which it will be applied. Apparently it is too late to offset imposed supervision with a thorough dose of self-regulation. At present, the Federal Power Commissions appears to be the most desirable body to impose the regulation which seems inevitable, due to its thorough knowledge of the workings and problems of the light and power companies.

AN ENGINEER, after a hard day at the office arguing with contractors and manufacturers' representatives over electrical items specified in his plans, approached the dinner table. With a weary voice he turned to his wife and asked, "What are you substituting for the salad?"

A Bigger Job Ahead For the Inspectors

IT IS an era of self-justification in which the electrical inspectors project themselves this month when they hold their annual conventions, one at Santa Barbara, another at Wenatchee. Like the engineers, who have just finished their convention with a formal program and a technical one, the inspectors actually will be facing prob-

lems not only concerning the technique of installing electrical wiring, but of the economic function which they perform in the community. As with the engineers, perhaps the most vital subject, the question of survival and sustenance, may never be touched upon from the floor.

"Why is an inspector?" In more cities than one, searching desperately for means to curtail civic expenses, the question will be asked. In the past the conclusive answer has always been, "to regulate and supervise new building construction." But that answer today has been nullified by inactivity. To that now-weakened reason for existence some electrical departments have recently added another answer, "to regulate and supervise the type and quality of appliances offered the public." It is an important new function.

Meanwhile, gradually, through the force of American boyhood's curiosity, American manhood's tinkering proclivities and American womanhood's decorative prerogatives, the nation has become a race of amateur wiremen. Unschooled in the electrical industry and caring little for it, this Inferential Brotherhood of Experimental Wiremen knows no codes, rules, regulations nor safety measures. Armed with a pair of auto-kit pliers and a screwdriver, the electrical contractor's original minimum wiring job is rendered "adequate" at last.

Organized and intended for the regulation of new wiring in construction, inspection departments are impotent in coping with this problem except in one single particular, which so far they have all but overlooked in their preoccupation and bewilderment. This single particular lies in the education of the public. Already a few far-sighted inspectors have anticipated this predicament. One made use of an exposition to conduct a booth explaining safety to his employers, the public. Another talks to luncheon clubs, women's clubs and schools. Another large city department conducts a testing laboratory, not for purposes of rule making, but for the education of its inspectors and the public.

This introduces a new function for the inspector and, in its truest significance, reverses his traditional position from a negative one—restricting, regulating, prohibiting—to a positive one, helpful, advisory, an educator in public safety and well being. Such a function is not dependent upon new building construction for its continued existence. Nor is it the unpopular function usually associated with inspecting.

Perhaps electrical inspectors need a new title. The inference of the word, its psychological implication, often condemns the wearer of it unjustly. Instead of "inspector", perhaps a more positive name is needed. Certainly it will be found when the present day inspector emerges from his role of looking for the faults of installation, into a new purpose, that of directing and advising the public on sensible safety, the economy of good quality and of skilled workmanship, and in all ways the more intelligent use of electricity.

"UTILITIES, through monthly or even more frequent contacts with their customers, enjoy an unfair sales advantage over the competing merchant" is one complaint of dealers who would legislate utilities out of merchandising. Brooklyn Union Gas Company has given plumbers in its territory a chance for equal competition on this score. Representative plumbers in different communities served have been authorized to collect monthly bills and accept applications for new service. Smart plan, we call that. It might be worth a trial by some of the Western power companies.

Rackets Must Not Wreck Industry Solidarity

SNIPING, sharp-shooting, back-biting and other less polite forms of racketeering have no place in the electrical business. In pointing out instances where tactics as detrimental and invidious as those of the warring cigarette manufacturers were creeping into electrical merchandising, a reader called our attention to a little book which has been read with avidity. "The Generals Go to War" sums up succinctly the spirit in which business has been conducted in the electrical industry for many years—a spirit which the industry can ill afford to sacrifice, particularly in these troublesome times. To quote:

"Competition in business will and should exist, as long as business itself is carried on. However, there is certainly no good reason to resort to the use of any unwarranted abuse of the competitor's product.

"Men in charge of any business owe allegiance not only to their own organization and to their customers, but also to the entire industry of which they are a part, and must recognize that in the tearing down of any individual unit the industry as a whole will suffer. . . .

"The history of business demonstrates that when organizations manufacturing and selling like products engage in negative advertising and cast doubt upon the value of each other's products, the entire industry of

which such concerns are a part is often heavily penalized. The public, being warned by one against another, protects itself against all.

"Of course, a certain amount of business can be secured by launching an attack upon the product of a competitor, but that practice has never been known to be successful in the actual 'building' of a business.

"The difference between 'building business' and 'getting business' is in exact ratio with the difference between vision and lack of vision, and it is a proved and recognized fact that 'where there is no vision the people perish.'"

Building electrical business is going to require more and more of that cooperation that has been shown in the Electric Refrigeration Bureau, the Electric Cookery Council, the joint efforts being promoted by NEMA, and the dealer cooperative activities of the power companies. The industry must nip in the bud any rackets that threaten to break the solidarity of its drive for more business and more load.

A STAYTON, Ore., citizen has been granted a security-sale permit by the State Corporation Department, empowering him to sell "$6,000 of his first mortgage 7 per cent personal bonds to refinance himself and provide working capital." If the laws were such as to permit issuance of personal revenue bonds, such as is the case with some municipal utilities, a lot of people who are at present just a little shy might try the same thing.

Squelch the Carrier Of Harmful Rumors

ACUTE nervousness, with perhaps a dash of hysteria, may be responsible for the almost absolute willingness of people to believe anything in these days. But that alone cannot be blamed for the contemptible and abhorrent rumors that are circulating around through the industry about almost every man and firm.

Perhaps editors hear more of these rumors than others, but if we were to believe a mere fraction of the whispered reports heard every day, most of the firms in the electrical business would be bankrupt and most of the people in the industry without jobs. All of the pages of ELECTRICAL WEST could be filled with reports—untrue, libelous, injurious—and there would still be a generous supply left over to be hung on hooks attached to the cover of the magazine.

There are two ways to stop these injurious whispering campaigns. Knowing them to be untrue, one can apply the short ugly word to the whisperer without impunity. Best of all, one can resolve to stop repeating these rumors himself.

Retention Vs. Lay-off

"JOB SECURITY through job sharing" is the slogan of various community and state organizations which are engaged in relieving, in so far as is possible, the unemployment situation in Western cities. The plan contemplates the sharing of work so that men and women may be retained on some sort of a payroll, rather than be laid off and thrown upon an already glutted human market. In this program the electrical industry may be expected to do its share.

Where job sharing for retention of employment has succeeded best, it has been because of certain definite beliefs and actions: First, work schedules and time off are best arrived at mutually in conference between employers and employees, fitting the particular needs of the job to the number of people available to handle it; second, a sincere desire exists on the part of both employer and employee to make it work, a spirit of unselfishness and of responsibility to the company, to fellow workers and to society itself.

Several large electric utilities in the West have adopted a shorter working week and, in some departments, shorter working hours. Speaking on this subject, one utility executive has said:

"The activities of these companies include many kinds of labor, including 24-hour operations. It is safe to say that if the spreading of work or the five day week can be adopted successfully by them, it can be used by any industrial or commercial establishment that will use a little ingenuity in planning its work. It has been estimated by competent authority that, at the present time, a 30-hour week would produce all that can be sold. I believe that shortening the hours of labor is the most important task immediately before us. We can continue to support for a while in idleness, through all forms of relief, seven or eight million people; but these people want work, not charity, and if the business of this country does not work out a sound plan for distributing available work, it may soon find forced upon it an unsound plan utilizing the power of taxation not limited by economic restraint as its basis."

Rate Trends ↓ and ↑ Tax Trends

By JOHN P. COGHLAN*
Second Vice-President and Assistant to the President, Pacific Gas and Electric Co.

ELECTRIC utilities, particularly the producing companies, hold a favorable situation in these uncertain days. Uninformed persons the country over are prone to credit this situation to chance or kindly circumstance, but those who think and reason know differently. Knowledge and good sense tell them that whatever favor the utilities enjoy comes not from accident or good fortune, but from intelligent management and sound planning—planning done long ago for the far future which is now, the present; and planning from month to month and day to day since the autumn of 1929, when shifting economic conditions began to call for quick modifications of accepted decisions and routines.

The electric power industry has not been the pampered darling of governments or politicians, sheltered by protective tariffs or exemptions from the common burdens that weigh on other businesses. It has had to fight for its place in the sun, helped to some degree, in some places, by regulation, but hampered everywhere by an increasing drain of taxation and by uninformed and frequently unscrupulous agitations and attacks.

The roots of the electric utilities' success lie mainly in two circumstances: (1) that the industry, being of quite modern origin, has from the beginning developed under regulation of some sort or other and has had the wisdom to cooperate with regulation; (2) that in progressive states like California the management of the industry from its earliest days has seen clearly that, for the long pull, the welfare of the business of producing and selling electric service demanded conservative financing without inflation, and the gradual lowering of rates so that more and more consumers would find it profitable to employ more and more electric energy in an increasing number and variety of uses.

Benefits of Regulation

Regulation has done much to protect legitimate producing power companies against irresponsible hold-up competition and, thus, has helped them to pass on to the public the benefits accruing from sound financing and from economies made possible by skillful management, increased volume of business and improvements in the art. Without regulation the savings effected by such economies would have been dissipated in fighting wasteful and anti-social competition. The companies surviving such competition would have emerged from the conflict with duplicated and unnecessary plants, which they had over-capitalized in order to acquire from the defeated competitors, and on the cost of which they would have had to try to earn a fair return from the consumer. Good service and low rates would have been impossible under those conditions.

It was pursuant to the settled policy of the electric utilities that, in the twenty years prior to 1929, while prices of almost every commodity mounted to unprecedented levels, the cost to the consumer of electric current was steadily downward; and the downward trend has not ceased during the depression.

These reductions have increased use and made electric current one of the cheapest necessaries in the home. In 1930, for example, the average rate to the domestic consumer decreased nationally between 4 and 5 per cent, while average use per domestic consumer increased by 9.6 per cent.

To illustrate the economic importance of this trend in the cost of electric current, according to the national statistics, in 1930 the domestic consumers in the United States saved 3 mills per kw.-hr. in their electric bill, as against 1929. As they used 11 billion kw.-hr., this was a saving of $33 millions to the housekeepers of the land. Those $33 millions bought many things, stimulated trade in many ways.

These reductions and savings were accomplished, please bear in mind, notwithstanding the fact that electric rates were below the pre-war level when the depression started, and now are lower in proportion than other commodities and service. Thus, in 1930 the average domestic rate was one-third lower than in 1912, the average commercial rate one-seventh lower, and the average industrial power rate one-fourth lower. At the same time, domestic use of electricity in the United States has far outstripped that of any country, our per capita use of electricity is four times as great as that of any other industrialized nation.

Nowhere have rates descended faster than in California. The largest company in California reports that, in 1931, the average paid by its domestic and commercial consumers was as low as 4.29 cents per kw.-hr. Consumption under this rate was near the highest in the United States, 975 kw.-hr. per year.

Go back eleven years to 1921, and we find that the yearly consumption was only 510 kw.-hr. and that the average selling price was 7.02 cents per kw.-hr.

Putting it another way, that company today has to sell 23 kw.-hr. to these classes of customers in order to produce the same amount of revenue in dollars that 14 kw.-hr. brought in 1921.

I have told how government has helped the companies through regulation. A word now about how government has hindered the companies through excessive taxation and through the short-sighted and improvident policy of granting tax-exemption to publicly-owned electric producing and distributing companies.

Besides furnishing employment to hundreds of thousands of men and women, and keeping up interest and

* Extracts from an address before the Pacific Coast Electrical Association, Pasadena, Calif., June 17, 1932.

dividend payments in outstanding fashion, even through these distressful days, the electric utilities have been one of the greatest contributors to the support of government and all its functions and in all its welfare undertakings.

The industry in 1931 paid $210 millions in taxes in the United States. That was more than 15 times the total cost of the United States government 100 years ago.

Since pre-war days, the industry's taxes have increased almost twice as rapidly as revenues from customers. For example, the reports of the California State Railroad Commission show that in 1924, the first year reported by the commission, the gas and electric utilities of California paid $11,631,638 in taxes. Six years later, in 1930, they paid $20,166,509. That is to say, from 1924 to 1930 the tax contribution went up 73 per cent, while in the same period gross revenue went up only 47 per cent.

For several years the electric utilities of the United States have contributed about 10 per cent of their gross revenues in taxes, and many of them more than 25 per cent of their net earnings. Indications are that these tax payments will be increased. Congress has just raised the income tax on corporations from 12 to 14 per cent of their net incomes and has levied a tax of 3 per cent on all energy used for domestic and commercial purposes. Many states are adding kilowatt-hour and other taxes; others are increasing rates and assessments. At the same time, government, foolishly, if we consider its own interest, and unfairly, if we consider the interest of the private companies and their customers, fails to tax the income of the publicly-owned utilities who are in active competition with the private companies that supply so much of the revenue of the federal, state and local governments.

Certainly government ought to foster the tax-paying private companies, at least to the extent of protecting them against tax-free competition. If the politicians took time to think what the taxes exacted from the electric utilities do for the government and the public, they would recognize that fact.

Consider, for example, what the taxes paid by the electric utility companies in California mean to the people of that state.

Where Utilities' Taxes Go

For the two-year period commenced July 1, 1931, the taxes paid by the electric companies into the state treasury will amount in round figures to $18,800,000, or approximately one-eighth of the general fund of the state. Out of that contribution:

There will be distributed to the elementary schools of the state, to meet teachers' salaries and other expenses, over $5,000,000.

There will go out to the high schools nearly $2,000,000.

The junior colleges will receive about $90,000.

The state university's share will be more than $2,000,000.

The teachers' colleges will get more than $600,000.

There will go to buy free text books for the school children of the state, nearly $103,000.

Over $200,000 will go to the aged and infirm through pensions; $67,000 to aid the blind and $420,000 to aid the orphans of the state.

After all these payments, there will still be left about $8 millions for other general expenses and miscellaneous items.

One might suppose that a group of taxpayers who carried so large a part of the state's and nation's burden and who have done and are doing so much to reduce the cost and to increase the comfort of living, who give employment to so many citizens and whose spendings help so much to keep all industries going, would be petted by the politicians and, in every legitimate way, preferred to the municipal public-ownership projects which not only contribute nothing themselves, but, by taking business from the private companies, actually reduce the volume of taxes paid to government by those companies.

However, there are politicians who find their political interest furthered by denouncing the electric utilities as public enemies. Listen, for instance, to Senator Norris, a typical baiter of the electric utilities, describing the "power trust," a phantasy of his own imagination. He says:

> "The only revenue of this combination is from the sale of electricity. It makes its unholy levy upon all classes of our people. The student, poring over his lessons under an electric light, contributes his share. The washerwoman, supporting her fatherless children, cannot escape the financial exactions of the power trust. The manufacturer must charge the consumer a higher price for his products because he likewise must contribute to the combination's unconscionable demands. No home is too humble or too lowly to escape its levies and no mansion is too great to be overlooked. No tax collector is more insidious in his demands or makes the collections with a greater degree of certainty and severity."

I quote that language because it is so characteristic of the sort of rather effective nonsense put out by the Norris stripe of politician. All that Senator Norris really says is that every person uses electricity and must pay for what he uses. There is no suggestion that electricity is and long has been the cheapest item in the budget of family, factory and farm, and is sold at rates fixed, not by the companies, but by regulatory bodies with a strong leaning toward giving the consumer the best of it. No credit is given to the electric utilities for easing the lives of workers in the household, farm or factory, or for reductions of rates made possible by the efficiency of engineers and management.

Yet, how many of our fellow citizens perceive the nonsense of such claptrap? How many realize that the words would be just as true and just as apt if they were uttered about the butcher, the grocer, the newspaper publisher or any other supplier of the necessaries of modern life?

Senator Norris displayed some hardihood when he referred to the tax collector, for he is one of those who have imposed on the American people and American industry the burden of taxation which California's Director of Finance, Rolland A. Vandegrift, described before the Chamber of Commerce of the United States, at San Francisco in May of this year, in this true and impressive language:

> "Year after year the tax burden has mounted in a veritable rising tide, sweeping on like a tidal wave, taking more and more of the income of the people, until its crest threatens to engulf not only business enterprises, but the very ownership of homes and land. In this last threat there is present danger of flooding out the American principle of government, which has its foundation in the right of ownership of private property, and particularly the right of every American to own and enjoy his home."

Too many of our politicians regard industry merely as something to be taxed. While all business has trimmed sails, the cost of government stubbornly has resisted deflation.

In view of what the electric utilities have done FOR the public and what the politicians have done TO the public in the last 20 years, the utilities may well court a comparison of their useful, constructive and economical service to the people with the non-productive, costly oratory and the tax-increasing activities of politicians in the United States Senate and elsewhere.

Analyzing, Reducing and Correcting Distribution Losses—

Before Energy Leaks in the Distribution System Can Be Stopped, It Is Necessary to Ascertain the Extent of Such Losses. The Authors Suggest a Practical Method for Determining Losses and Remedies Which May Reduce Them, Thus Releasing Transmission Substation and Distribution Capacity for Revenue-Producing Load

A MAJOR factor in the success of any organization engaged in the production of electrical energy is the ratio of energy produced to energy sold. The importance of this factor easily can be understood when one considers that, for the various operating companies in the West, the difference between energy produced and energy sold varies from 13 to 28 per cent.

It is obvious that losses must be traced to their source before any attempt can be made toward their reduction. Ordinarily it is quite simple to determine and segregate the losses occurring at the generating stations and on the transmission system, because there are so few factors involved—operating efficiencies of the various units, line loss, transformer loss and losses in synchronous condensers or other voltage stabilizing devices—and it is necessary merely to compare the readings of input and output meters or to make fairly straight-forward calculations.

It is quite simple to determine the total energy losses on the distribution system, but the segregation or factoring of this total into its constituents may require some skill, imagination and ingenuity. In many cases there are not sufficient meters installed to give the whole story. Accounting methods may not be sufficiently detailed, or accurate, or straightforward to lend themselves easily to analysis. Difficulties may be encountered, where several substations and circuits supply a given locality, in determining the sum of customers' meters on any one substation or circuit. Meter errors and human errors or indifference in compiling the data for the various reports also may complicate matters.

In considering the last two items, it may not be amiss to remark that, if it is worth while to put kilowatt-hour figures relating to generation, transmission, distribution and sales into operating reports of various companies (an almost universal practice), it is worth while to see that the figures used essentially are correct. If the cost of a meter installation is justified, then the cost of periodic accuracy tests is justified, even if the results are not used for billing.

While this article is concerned primarily with the segregation of distribution system losses, there will be some discussion of generating station and transmission losses, and also a brief statement of possible methods of saving losses.

E. W. HEMPEL

P. P. ASHWORTH

Distribution Losses; Their Segregation

Total losses in a distribution system are made up of the following items:

(1) Transformer losses—copper and iron
(2) Induction regulator losses—copper and iron
(3) Metering equipment
(4) Primary circuit copper
(5) Secondary circuit copper
(6) Street lighting circuits and equipment
(7) Flat rate equipment, overburning and theft
(8) Meter errors
(9) Special conversion equipment, such as m.g. sets, converters, etc.
(10)* Company use
(11)* Donations—free service
(12) Theft, miscellaneous unaccounted-for energy.

*Company use and donations of energy are included as losses although, strictly speaking, they may not properly be considered as such.

Methods adopted to segregate the various losses will depend upon the degree of refinement which may be required. Methods which have proved satisfactory on one property are outlined in the following paragraphs.

(1) Transformer losses—Prepare a list of transformers on the system giving the number of each size. Transformers which are used for primary voltage customers, i.e., where customers pay for the losses, should not be included.

Iron loss can be calculated directly from data (supplied by the manufacturers) which give the average iron loss for transformers of various years of manufacture. If a sizeable percentage of transformers is very old, the additional loss due to aging should be taken into account. Sufficient accuracy should be obtained by assuming that all transformers were manufactured in one certain year, and applying the manufacturer's figures for that year.

To determine transformer copper losses, connect graphic ammeters on a number of typical installations for a few days to get the shape of the daily load curve. The loss at full load is given by the manufacturer's data. From the load distribution throughout the day and the full load copper loss, the total I^2R loss for the period of the chart may be calculated. The average of a number of typical installations should give factors which are sufficiently accurate to apply to the entire

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system. Table I gives the data secured on four typical transformers.

(2) Induction regulator losses—Performance data furnished by the manufacturer and a knowledge of the average daily load curve make it possible to calculate induction regulator losses in a manner similar to that used for transformers.

(3) Metering equipment—The potential coils of watthour meters absorb from 1 to 5 watts, depending upon the type of meter and the year of manufacture. Observations by the meter department of one utility indicated that the average loss was about 1.7 watts per meter. Using this factor, the number of meters and the time in service, the total loss may be estimated.

Knowing the number and type of instrument transformers, the average loss and the time connected, the total losses on instrument transformers may be calculated.

(4) Primary circuit copper losses—These losses can be calculated from the daily load curves for a number of typical installations. From a study of a scale map of the circuit and the location and size of transformers, it can be assumed that various blocks of load are concentrated along the circuit, this distribution being based as nearly as possible on the actual facts. Then, by knowing the copper sizes in the circuits, the I^2R loss can be calculated for each particular section for each hour of the period under consideration. The total loss can thus be obtained and expressed as a percentage of that delivered to the circuit. After a number of such calculations, it becomes possible to estimate this loss quite closely without working out all of the details for each circuit.

(5) Secondary copper losses—These losses can be calculated in a manner similar to that used for primary circuits. It is necessary to know the shape of the daily load curve of a number of typical installations. The type of customer use gives an indication of the load distribution. Then, knowing the physical characteristics of the circuit, the I^2R loss can be calculated and this loss can be expressed as a percentage of the energy delivered. After a few such calculations, it becomes possible also to estimate the loss on any secondary circuit with reasonable accuracy.

(6) Street lighting circuits and equipment losses—These losses are determined easily if the circuits are metered. If not metered, the losses can be estimated step by step from supply equipment, through the circuits and to the lamps.

(7) Flat rate equipment, overburning and theft—Some companies maintain flat rate schedules. This service is not metered and the amount of overburning and theft will depend largely on the method of control. The loss resulting from this service can be estimated without difficulty. In any case, it is a small item.

(8) Meter error losses—The majority of watthour meters now installed on the average system require a load of from 0.4 per cent to 0.6 per cent of the rated meter capacity to start rotation. The load consumed by the ordinary bell-ringing transformer of electric clock is usually about 2.5 watts and will not register on the meter unless some other energy consuming device also is in service. The loss due to such devices can be estimated with reasonable accuracy by making certain assumptions as to the number of low load devices installed and the time that they alone are connected to the system.

With modern meters of high accuracy and the high standard of meter maintenance practiced by most private companies, it is doubtful if the overall system loss due to inaccurate meters is appreciable. Where there are many of the older type meters in service, it may be advisable to estimate the possible loss from this source. (See "Meter Studies Can Pay Dividends," by J. P. Surratt, EWEST, August 1, 1932, p. 68.)

(9) Special conversion equipment—If a company furnishes direct current service, the losses caused by the conversion equipment should be taken into account. This usually can be obtained from meter readings, or it may be computed step by step.

(10) Company use—Company use is not strictly a loss. It must, however, be accounted for and the results are quite illuminating. These figures usually are obtained from meter readings, although occasionally the energy used must be based on estimate.

(11) Donations—It usually is possible to estimate any donation of energy or free service, such as might be expected for celebrations, pageants or for Christmas lighting.

(12) Theft—It is impossible accurately to estimate theft. The difference between the sum of all the items mentioned and the total loss will include theft as well as any errors in assumptions that have been made.

Table II illustrates the results of an analysis of losses on a typical distribution system.

One of the most interesting features of a loss study is the number of inconsistencies which develop in interpreting the available data, and which may be accounted for. For example, it may be found that the total of the individual loss items may exceed the known total loss items, or that theft and miscellaneous loss may be too large or too small. Typical reasons for such discrepancies may be: Energy delivered to a new circuit may not be accounted for in the reports; meter errors due to change in instrument transformer ratios or to blown potential fuses; errors in taking into account certain exchange energy; inaccurate estimates of substation input where meters are not installed; total energy sold from one substation considered to be the total substation input; etc. As a rule none of these inconsisten-

TABLE I

Daily Load Curve—Typical Distribution Transformer in Residence Districts

	Transformer No. 1	Transformer No. 2	Transformer No. 3	Transformer No. 4
Size of transformers	5 kw.	10 kw.	15 kw.	20 kw.
Customers supplied with lights only	33	40	12	0
Customers supplied with lights and range	4	11	16	16
Customers with lights, ranges and water heaters	0	0	2	5
Total customers connected	37	51	30	21
Peak load, from curve drawing chart	9.60 kw.	19.20 kw.	20.90 kw.	33.60 kw.
Average load	1.78 kw.	4.69 kw.	7.08 kw.	8.06 kw.
Load factor	18.5%	24.4%	33.9%	24%
Duration of peak load in hours	0.25	0.50	0.50	0.50
Duration of 100% load in hours	3.00	4.00	1.25	1.75
Duration of 50% load in hours	5.75	10.50	9.50	5.25
Duration of 25% load in hours	15.00	9.00	3.00	10.00
Duration of 10% load in hours	0.00	0.00	9.75	6.50

TABLE II

Analysis of Distribution System Energy Losses
Segregation of Items in Per Cent of Total

Item	Division No. 1	Division No. 2	Division No. 3	Division No. 4	Division No. 5	Division No. 6
Energy unaccounted for, expressed in per cent of energy delivered to distribution circuits	16.45	17.10	16.86	16.90	12.20	15.82
(1) Transformer iron losses	16.10	23.95	23.60	28.00	25.35	15.85
(1a) Transformer copper losses	10.10	13.40	20.00	8.82	14.30	12.05
(2) Induction regulator iron losses	1.42	1.74	1.98	1.00	0.98	2.29
(2a) Induction regulator copper losses	2.13	2.34	1.82	0.50	0.58	4.03
(3) Metering equipment losses	4.33	5.20	4.46	5.60	8.74	1.92
(4) Primary copper loss	38.87	30.95	31.20	29.90	29.05	39.45
(5) Secondary copper loss	4.56	4.19	3.45	2.34	3.73	4.78
(6) Street lighting losses	4.17	4.60	2.65	7.20	5.88	9.50
(7) Flat rate lighting losses	1.95	0.28	0.90	...	...	...
(8) Metering errors	2.49	0.90	0.76	0.99	1.94	1.56
(9) D. C. elevator circuit losses	3.88	2.60	...	...	...	...
(10) Company use	7.25	4.57	4.18	16.10	4.98	3.81
(11) Theft, Donations, Errors in assumption	0.78	2.38	5.00	0.55	4.47	4.76
(12) Exchange energy	1.97	2.90	...	...	...	...
	100.00	100.00	100.00	100.00	100.00	100.00

Divisions 1, 2, 6—Urban territory with considerable industrial and rural load.
Division 3—Urban and rural with considerable mining load.
Divisions 4 and 5—Largely mining, with some urban and rural load.

cies will affect customers' billings in any way, since they occur solely in the utility's own accounts.

The accompanying table (III) has been prepared to emphasize concretely the magnitude of system losses and the importance of analyzing such losses. This table segregates the total yearly losses on a hydro-electric system which has a gross input of about 670,000,000 kw.-hr. and indicates the approximate capital investment necessary to supply these losses.

Ways and Means of Reducing Losses

Fundamentally, the problem of reducing losses is not only one of straight-forward engineering and operating analysis, but also of economics. After the entire power system and its operation have been studied and losses have been segregated, the problem may be resolved into the following two questions:

What changes and improvements in operating procedure can be adopted which will result in saving energy losses, or, stated differently, how can the overall efficiency of operation be increased? What changes and improvements in the physical plant to save losses and increase efficiency can be justified economically?

Experience indicates that engineers in the past have devoted themselves largely to the consideration of the second question, and perhaps logically so, because of the fascination of designing and constructing new physical works and also because the operation of the system, once constructed, has been removed from the immediate jurisdiction of the engineer.

The answer to the second question always means the expenditure of money for the additional facilities which are provided, whereas no appreciable investment, aside from the cost of the engineering analysis, is required in the best answer to the first question.

It is obvious, therefore, that the solution to the first question should be obtained before much consideration is given to the second, which involves capital expenditures. In other words, the engineer should be sure that the investment already made is being used to the best advantage before he recommends additional expenditures. For example, a study on one system showed that a yearly saving of about 6,400,000 kw.-hr. could be made without one cent of cost by merely changing operating procedure. (See "Reducing System Losses With Efficiency and Load Duration Curves," by John Bankus, EWEST, June 1, 1932, p. 548.)

A further basic consideration is that of setting up a future development program for the entire system, so that as improvements are made they will fit into the general program. The commercial policies, contractual relationships and rate schedules of the companies may have quite as much bearing on the question as do the operating and engineering features and the engineer should fully advise himself on all of these matters.

Assuming that the advisability of saving losses has been established, and that all of the other preliminaries have been disposed of, the following suggestions are offered.

Losses in generation and transmission can be maintained at a minimum by operating the most efficient units or groups of units, by utilizing the available transmission copper and condenser capacity to best advantage and by using only the necessary transformer capacity.

More than 60 per cent of the distribution system losses are in primary copper and in distribution transformers, so these two items logically should be the center of attack. It is a comparatively simple matter to assume certain loads at certain locations, at certain load factors and voltage regulations, etc., copper and labor at certain prices and fixed charges at certain percentages, and from these assumed values calculate the most efficient size of primary copper to use in that particular case. However, there are so many variables

TABLE III

	Kw.-hr.	Capacity required to supply losses at 60 per cent load factor	Investment cost per kw.	Total investment cost	Annual fixed charges at 12 per cent
Station use and loss	19,122,000	3,640	$200	$ 728,000	$ 87,400
Transmission loss	70,826,000	13,400	300	4,020,000	482,000
Substation use and loss	6,187,000	1,170	325	380,250	45,600
Distribution loss	28,183,000	5,340	525	2,803,500	337,000
Company use	1,869,000	350	525	183,750	22,000
Total loss	126,187,000	23,900		$8,115,500	$974,000

To obtain the total cost of supplying the system losses, it would be necessary to add to the above figures the cost of producing this energy.

that, at best, such calculations merely give a good indication of what size of conductors should be used. In the actual case, a voltage and load survey will readily indicate the points on the circuit where there is a deficiency of copper. In reducing both primary and transformer losses, advantage should be taken of load diversity wherever practicable. Thus, ties may be made between adjacent feeder branches; fewer and larger transformers with larger secondaries may be advisable.

In general, it can be stated that "there is nothing so cheap as copper on the line." The cost of maintaining the copper is low and the depreciation is practically nil.

The overhead network for both primary and secondary circuits would seem to have great possibilities in reducing transformer and circuit losses. If the primary system is Y-connected with neutral carried out, then the primary network should be 3-phase, so that advantage can be taken of the Y voltage.

It is sometimes suggested that old transformers with high core loss should be replaced with modern transformers. Numerous cases of this kind have been considered by the authors and they have yet to find a case in which the saving in energy losses will justify the change. The following practice of one company has proved economical:

When a transformer is replaced because of damage, insufficient capacity or for any other reason, the old transformer comes into the shop. If the serial number indicates that it is of such vintage that the iron is

TABLE IV

Item		
a. Annual circuit output, 1926 (kva.)		4,237,300
b. Total delivered to customers (kva.)		3,604,265
c. Total annual loss (kva.)		633,035
d. Loss in station output (per cent)		14.7
e. Total annual transformer loss (kva.)		140,510
f. Total meter loss (kva.)		49,056
g. Present copper loss (includes possible theft) (kva.)		443,469
h. Present power factor (per cent)		70
i. Reactive kva.-hr., original power factor		4,300,000
Estimated Results of Power Factor Correction	**To 85%**	**To 90%**
j. Copper loss at improved power factor: $g = \frac{(\text{Initial PF})^2}{(\text{Improved PF})^2}$	301,000	278,050
k. Kw.-hr. saving due to correction (g-j)	142,469	165,419
l. Reactive kva.-hr., improved power factor	2,625,000	2,063,000
m. Reactive kva.-hr. necessary for correction	1,675,000	2,247,000
n. Corrective capacity in kva.: $\frac{(i\text{-}l)\ m}{(360 \times 24)}$	194	238
o. Outdoor pole-type capacitors required	{2 of 90 kva. {1 of 15 kva.	2 of 90 kva. 1 of 60 kva.
p. Approx. cost, including installation	$3,930	$4,685
q. Capacitor losses, kw.-hr. annually	4,210	5,190
r. Net kw.-hr. saved due to correction (k-q)	138,259	160,229
s. Value at 1.5 c. (combination residential and power load)	$2,075	$2,403
t. Increase of effective capacity of substation	124 kva.	154 kva.
u. Value of increase at $17 per kva.	$2,110	$2,615
v. Annual saving in per cent of cost of equipment	52.8	51.3
w. Value of increased capacity in per cent of total cost	53.7	55.8

subject to aging, and if the transformer requires any appreciable repairs, then it is junked. By following this procedure, the transformers which have high core loss logically are removed from property. Experience indicates also that it is not economical to replace obsolete with modern meters only to reduce energy losses.

Energy losses in street lighting are due largely to series systems. While the series system cannot be justified on any grounds, except in rare cases, it is generally not economical to change an existing series system to a multiple one, although the increased efficiency is considerable and the losses may be reduced greatly by the change.

The increasing use of synchronous converters and mercury arc rectifiers in place of motor-generator sets for conversion of a.c. to d.c. and the elimination of conversion entirely on many applications formerly exclusively d.c. (elevators for example), is automatically reducing the conversion losses.

Equipment for improving the power factor of the load often will prove highly advantageous. Table IV gives the results of an analysis of a typical 1,000-kva., 4,000-volt distribution circuit which supplies domestic and small industrial loads, and shows the estimated results of power factor correction, together with the cost of the corrective measures.

On this particular system, the capacity effect of the high voltage transmission lines results in a high average generator power factor. Improvement of load power factor does not appreciably increase the effective capacity of the generating stations. For this reason no attempt was made to capitalize the increased effective generator capacity in this study. On some systems, however, the value of the increased generating and transmission capacity may be great and may justify large expenditures in power factor correction. In any given case, the means used to save losses will be determined by the load conditions.

Enough data have probably been given in the foregoing to indicate the advantages of a system energy loss study if the study doesn't cost too much. Experience indicates that in about 60 days, one engineer, with the cooperation of the operating and accounting departments, can make an energy loss study for a good-sized system. It is doubtful if there is any other work on a power system which, with such a small investment of time and money, offers an equal possibility for yielding such large returns.

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Photography Aids in Deceleration Tests

More Accurate Determination of Generator Characteristics Is Insured by Taking Group Pictures of all Meters at Points on the Deceleration Curve

By A. D. IRION
Test Engineer, Southern California Edison Company Ltd.

VARIOUS methods used by manufacturers in determining losses and efficiencies of a.c. generators generally are well known. However, as the size of units has increased, it has not always been practicable and economical to completely assemble units at the factory for test prior to shipment. While it is desirable to know the various segregated losses, on the largest generators these data can be obtained only from field tests. In making field tests, a number of factors must be taken into consideration, such as system operating conditions, availability of units to be tested and the costs of tests. The costs of field tests are considerably in excess of similar shop tests and, therefore, it is expected that comparable results in accuracy should be obtained.

When the contract was let for two 45,000-kva., 50-cycle, 11,000-volt, 250-r.p.m. horizontal generators for Southern California Edison's Big Creek No. 2A power house, certain stipulations were made as to efficiencies of the water wheels. In the event the efficiency was found to be greater than anticipated, an extra bonus was to be allowed the water wheel manufacturer. Both horizontal units were direct-connected to two overhung impulse water wheels.

It was obvious that the only feasible method for determining the generator losses was from deceleration tests. After careful study and planning, a complete

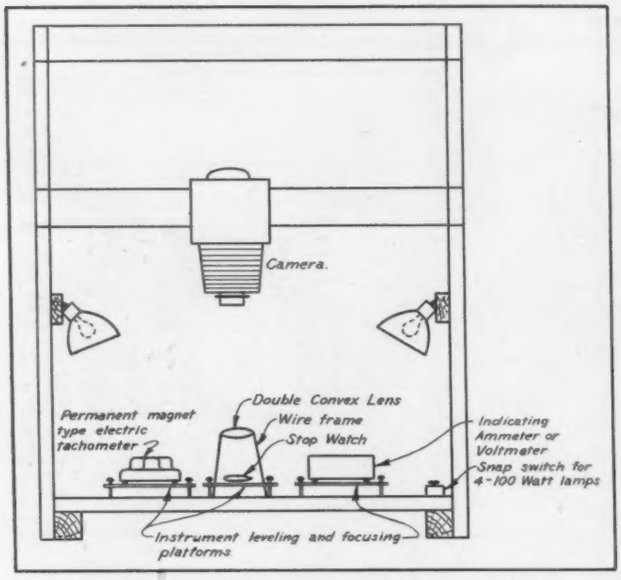


Fig. 1—Photographic platform for instruments, showing the mounting of the camera and the optical system for magnifying stop watch readings

manual of tests was prepared which, it is believed, makes use of a method of recording readings which is not only unusual, but, as proved by test, is unusually accurate.

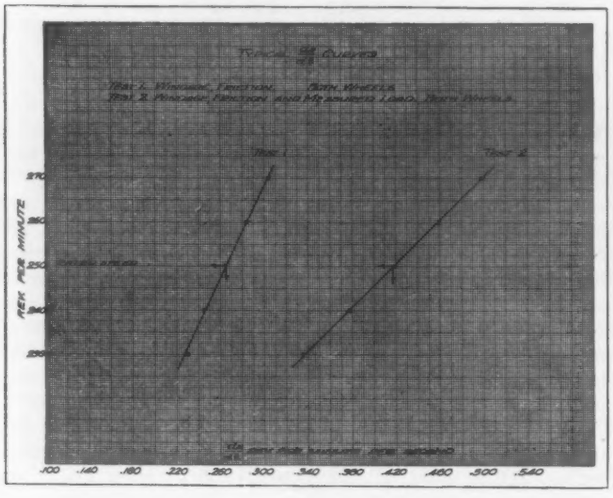
Briefly, the tests necessary for the calculation of generator efficiency at all loads during the over-all efficiency determination are as follows:

1. Resistance of generator windings.
2. Core loss.
3. Exciter input (exciter being direct-connected to generator shaft).
4. Armature I^2R loss.
5. Stray load loss.
6. Generator windage and bearing friction.

Test 1 obviously is obtained easily and test 3 is calculated readily with complete test data of the exciter on hand. Data for tests 2, 4, 5 and 6 must be obtained from deceleration curves, the methods and calculations employed being hereinafter described.

The kilowatt loss for any deceleration test evolves into the final equation:

Fig. 2—Typical deceleration curves calculated from the photographic records



$$\text{Kw.} = 0.46218 \times 10^{-6}\ WR^2 \times s \times \frac{ds}{dt}, \text{ where}$$

S = speed and

$\frac{ds}{dt}$ = r.p.m./s at speed S.

It is apparent that any loss is directly proportional to WR^2. As before mentioned, the complete unit was assembled in the field, so only calculated values of WR^2 were obtainable. The true value of WR^2 therefore is of paramount importance if reliable results are to be obtained.

It can be shown that if a known added load of P kilowatts is applied to the unit,

$$WR^2 = \frac{P}{0.46218 \times 10^{-6} \times S \left(\frac{ds_1}{dt} - \frac{ds_2}{dt}\right)} \text{ where}$$

$\frac{ds_1}{dt}$ = deceleration with an added load of P kilowatts, and

$\frac{ds_2}{dt}$ = deceleration under friction and windage only.

The known load of P kilowatts was obtained by using the direct-connected exciter, whose normal rating is 340 kw. at 250 volts, and designing a resistance unit that would consume approximately 350 kw. at 250 volts at normal speed. The unit was immersed in the tailrace to maintain a uniform temperature.

Complete generator deceleration curves were taken in the following order:

Test 1. Windage and friction, both water-wheels.

Test 2. Windage, friction and measured load, both wheels.

Tests 3, 4 and 5. Windage, friction and stray load loss at values of field current to give 50 per cent, 100 per cent and 125 per cent armature current.

Tests 6, 7 and 8. Windage, friction and core loss at values of field current to give 90 per cent, 100 per cent and 110 per cent normal voltage at rated speed.

Test 9. Windage and friction with one set of buckets and wheel disk removed.

Test 10. Windage, friction and measured load, with one set of buckets and wheel disk removed.

To record all observed readings during deceleration runs, a photographic method was developed. Speed was measured by means of a permanent-magnet type electric tachometer, direct-connected to the generator shaft. Time was noted by means of continuous running, combination chronometer-stop watch whose accuracy was known to be within 0.2 seconds in a 30-minute period. All instruments were placed on a substantial portable table and each was provided with an adjustable platform for leveling and focusing purposes. A double-convex lens was used to enlarge the watch face to facilitate readings after pictures had been taken. Artificial light from incandescent lamps was used so that pictures taken either in daylight or at night received the same amount of exposure. Fig. 1 illustrates the general arrangement of instruments.

Each film was double exposed so that a total of 24

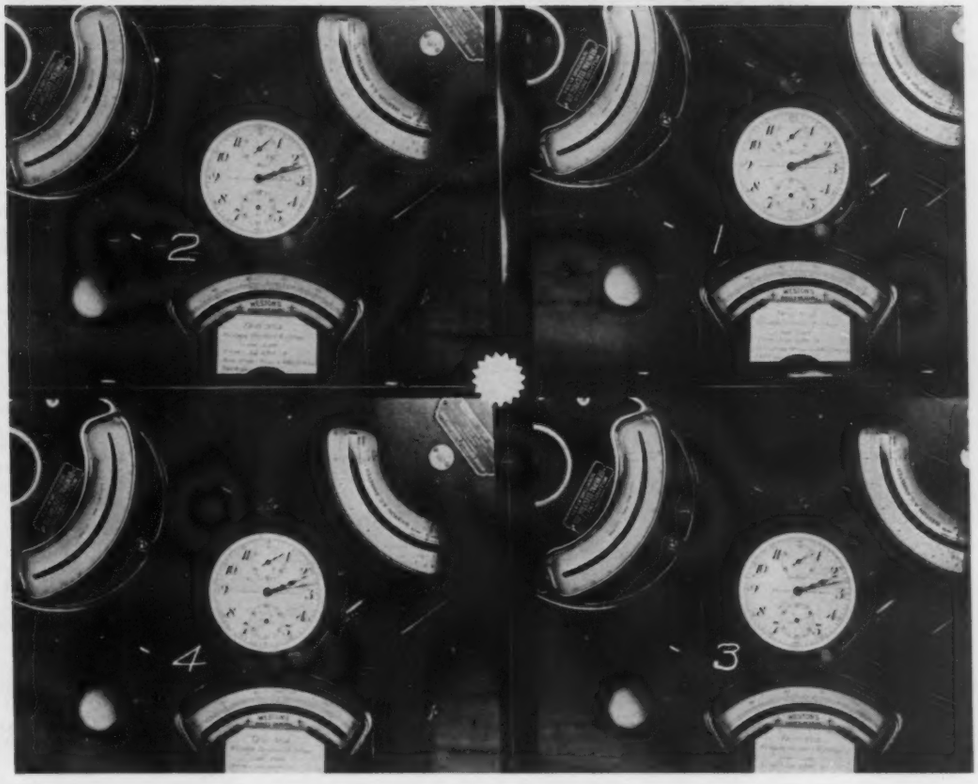


Fig. 3—Four photographs of meter readings during the windage, friction and stray load loss run. Eight readings are here recorded, two exposures being made on each negative as indicated by the apparently double second-hand on the watch

readings could be obtained from a standard 4x5-in. film pack. The camera used was equipped with a rectilinear lens and focal plane shutter. A card for each deceleration run was numbered and contained all data relative to run made, date of test, etc. Tabulated readings were taken directly from the films themselves, over an opaque glass properly illuminated. It is apparent that a permanent record of every instrument was made, entirely free from personal error. The films, as a matter of record, later were developed and prints made with four films per sheet. The order of films was determined from the combination stop watch.

Speed-time curves were plotted on cross-section paper using 0.2 in. per revolution as ordinates and 0.1 in. per second as abscissae, and the slope of each curve determined at speeds of 270, 260, 250, 240 and 230 r.p.m. In all tests the speed of the unit was raised to 300 r.p.m., and readings recorded from 300 to 200 r.p.m. From the five values of $\frac{ds}{dt}$ obtained from those readings, another curve was drawn to check the value of $\frac{ds}{dt}$ at the normal speed of the unit (250 r.p.m.)

In one series of tests the unit was brought from standstill up to speed as a synchronous motor, using a generator and line from another power house as the source of energy. When the proper speed was reached the circuit was opened and readings taken. In the series of tests on the second unit, the machine was brought up to speed with its own waterwheel and the nozzle deflected when a speed of 300 r.p.m. was reached. Where required, separate excitation was used for the generator field so that all necessary switching could be accomplished within a ten-second period after the deceleration run had started.

From tests 1 and 2, the total WR^2 of the unit was obtained; tests 9 and 10 gave the WR^2 of the unit with only one wheel. By using the formula given, the friction and windage of the generator and exciters were calculated.

Curves showing armature I^2R loss and stray load loss were obtained from tests 3, 4 and 5 and corrected to 75 deg. C. Tests 6, 7 and 8 gave a core loss curve which enabled true core loss to be found at every value of voltage in the over-all efficiency test conducted at a later date.

With complete data of segregated losses at hand, true generator input at any load was figured. Runs were made in a minimum length of time, the reading of films and plotting of curves consuming a major portion of the time allotted for the tests.

Results proved the method to be most practicable. Personal error is eliminated, insuring accurate results. Minimum expense and time are involved as the equipment is portable and easily set up, and a permanent photographic record of all readings is maintained for future reference.

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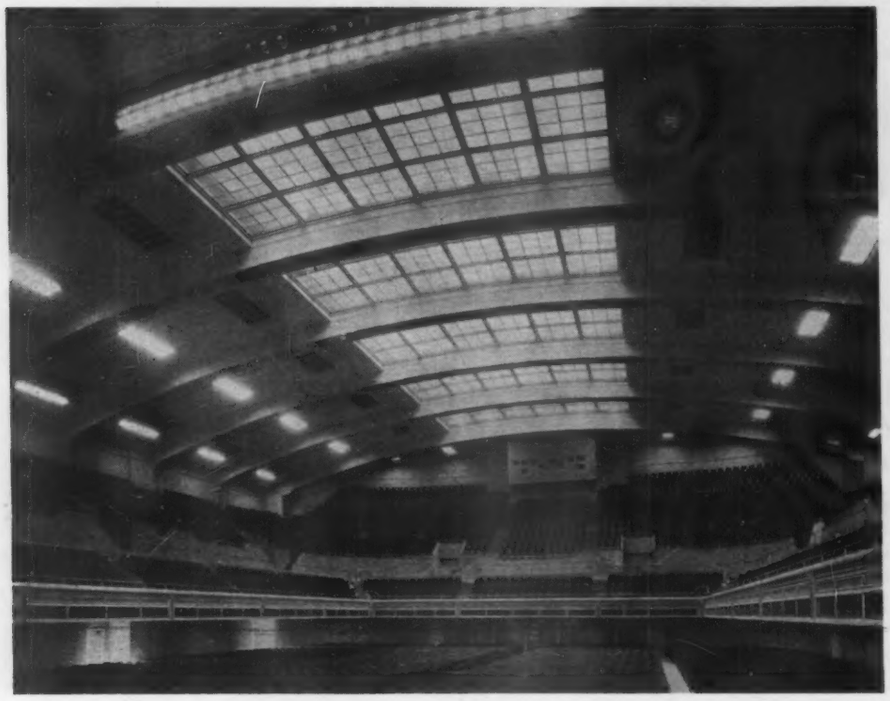
Conductors Selected for Heat-Radiating Ability

CONDUCTORS on the two-circuit line which connects Shuffleton steam plant of the Puget Sound Power & Light Co. with Renton switching station, 3 mi. away, are 500,000-circ. mil, hollow-core copper with an I-beam center; this type and size was selected to conform with operating requirements rather than to eliminate corona. It was desirable to have either circuit carry the full capacity of the steam station, equivalent to 1,000 amp. at the 55-kv. transmitting voltage. To prevent annealing and weakening of the conductors under this load, it was necessary to provide the largest radiating surface available in the hollow-core conductor.



At one end of the building is the main auditorium, seating 5,000. The principal lighting is from the central, 6,000 sq. ft. artificial skylight, above which are 90 300-watt clear lamps in special, ripple-mirror-lined reflectors, to which color frames may be attached if desirable. Above the balcony, at the sides and rear, are opal glass panels, flush in the ceiling. Soffit lights beneath the balcony are similar flush panels. Thus the lighting intensity is fairly high, averaging 16 foot-candles over the main floor. Emergency lighting is provided by fifteen 500 watt lamps above the skylight. In each hall a false ceiling beam is arranged for ante-proscenium spots and floodlights, with a plugging raceway containing various color dimming circuits. In the false beam of the auditorium (at the forward end of the skylight), there is also a constant line for high intensity arc spots. At three locations at the balcony rail are regulation stage pockets. Outside the auditorium, the railing of the principal terrace is piped for outdoor standards, to be connected into the street lighting system

One Stage Serves Two Theaters

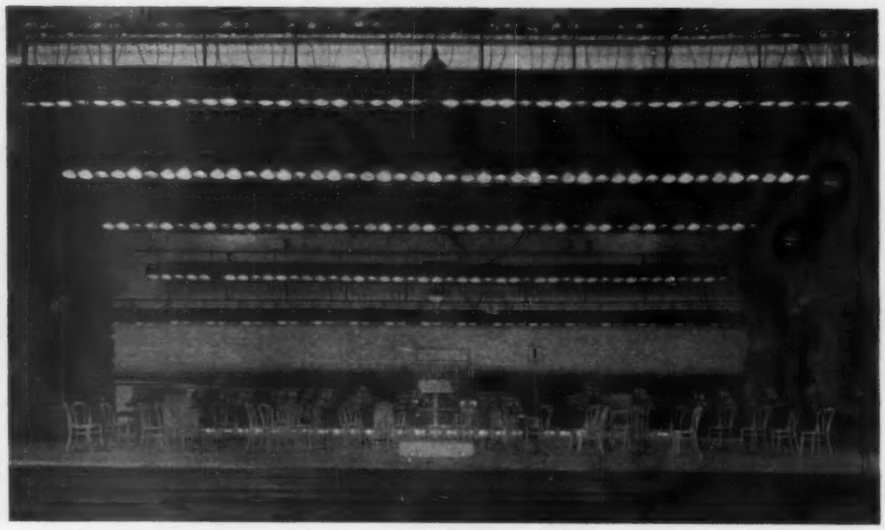
By D. S. BOWMAN
Consulting Engineer, Los Angeles

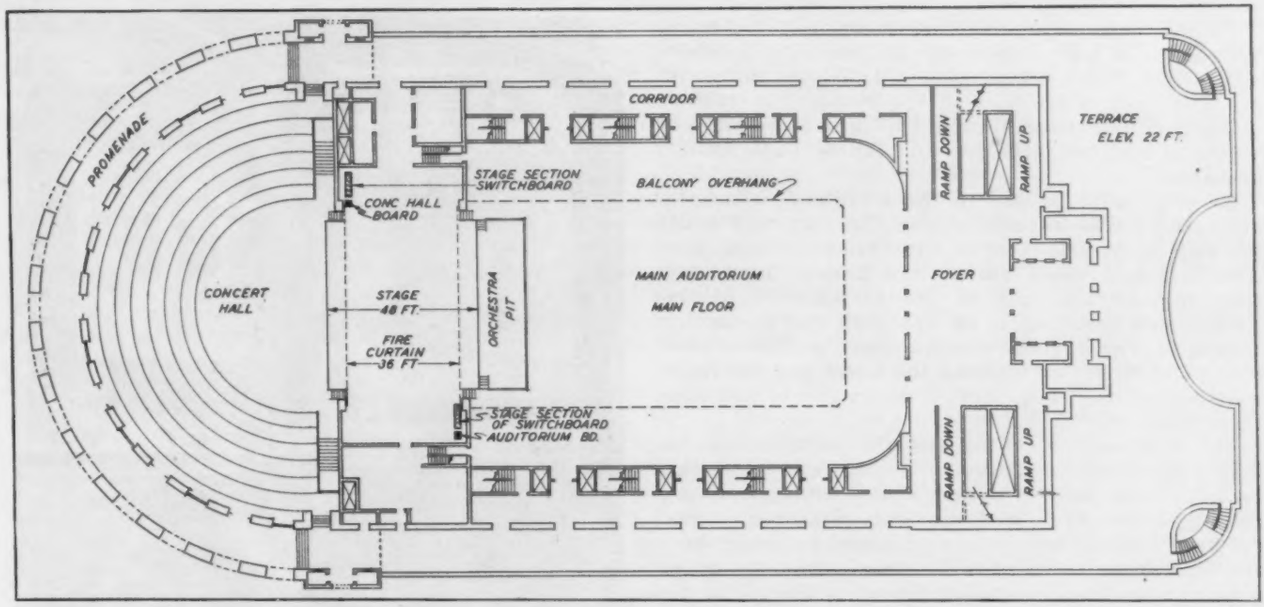
There Are Two Sides to This Stage, But Only One Side to the Statement That the Long Beach Municipal Auditorium Has No Parallel, Electrically

LONG BEACH, Calif., has built a municipal auditorium which looks much like any other modern auditorium on the outside. But, electrically speaking, the Long Beach Auditorium has yet to find its parallel. In fact, much of the originality of the electrical features can be traced to a recent development, the thermionic tube.

This building was made to provide attractive and suitable accommodations for such public affairs as conventions, trade shows, theatrical and musical entertainment, lectures and large public meetings. It is a 400 x 175 ft. building containing several large audience

Connecting the main theater and the concert hall, at opposite ends of the building, is a single stage with two prosceniums. Because of the double use for the stage, much of the equipment is reversible. Each proscenium has a disappearing footlight trough, as shown in the photograph, and a concert border suspending regulation border hoods. The main hood section has 45 500-watt lamps in three colors, with a removable extension arm for six lamps at each end. In addition, there are three intermediate border lights, the battens of which have ball-bearing hangers, with a simple, enclosed, crank-operated, worm-gear mechanism at one end so the borders may be reversed for use with either proscenium. Above the hoods are a pipe framework for clamping spots and floods and a permanently-wired raceway into which all movable items may be plugged





Floor plan showing the location of the stage. The black squares (designating concert hall and auditorium boards) are permanently fixed. The shaded rectangles indicate the spots where the reversible stage sections are moved, depending upon the use

halls, exhibition space, committee and lecture rooms. The ground level is given over to an exhibition hall. On two sides and one end of this a mezzanine balcony affords bleacher seating for athletic events. Also on the ground level are the transformer and switchboard rooms, boiler plant, carpenter shop, shower and dressing rooms, storage spaces and a commodious foyer. On the next level, at one end, is the main auditorium. At the opposite end on the same level is a semi-circular concert hall, seating about 1,200 people. Between these two halls and serving both interchangeably is a stage, details of which will be described later.

Adequate lighting is provided throughout, the total connected load being about 800 kw. for lighting and 750 hp. for power. In the exhibition hall, a large, plain floor space intended mainly for trade shows, industrial exhibitions and indoor athletics, the general lighting is from 34 750-watt units, 20 ft. above the floor. Beneath the balcony are additional 300-watt units. At intervals around the side, in furred columns, are service outlets with receptacles for light, power and telephones. These are for temporary extensions to serve exhibition booths and offer 3-phase and single-phase power at 208 volts and single-phase power at 120 volts. There are ten such groups on this level and for overflow use there are six groups of flush floor outlets in the main auditorium immediately above. Near these groups are mechanical service pockets where temporary connections may be made for compressed air, water, natural gas, steam and waste.

Illumination in the concert hall is totally indirect from a continuous architectural cove along the semi-circular rear walls. This cove is 8 ft. below the ceiling plane and contains three-color lighting, 108 200-watt lamps per color, backed by a continuous ripple-mirror-lined reflector. Emergency lighting (2,700 watts) is also provided in this cove. The lighting effects harmonize with the atmosphere of this room, giving a softly diffused glow, with a 6 foot-candle intensity on the floor.

Features of the main auditorium lighting are told in the caption to an accompanying photograph. The other general lighting is mostly from commercial type fixtures, with ornamental designs in the more conspicuous locations.

On the ground floor level, the Southern California Edison Co. has installed a network substation, into which is run underground duplicate 208-volt secondary services from a network vault about 500 ft. away. Service is 3-phase, 4-wire from the Long Beach secondary network system. The transformer vault contains two 300-kva., 4,155/208-volt, 3-phase, 50-cycle, type O.I.S.C. network transformers, with network protectors mounted on the walls. From this vault to the main switchboard, in concrete raceways at floor levels, go the low voltage service cables. These services consist of 24 500,000-circ. mil cables for 4-wire main lighting, 18 500,000-circ. mil cables for 3-wire, 3-phase main power, and the separate low-voltage services of lesser capacity for emergency light and power.

On the main switchboard, all live parts except circuit breakers are exposed on the rear; this is accessible via an end panel containing a locked door. The main service breakers for light and power each are rated 2,400 amp., the breaker for the stage feeder is rated 800 amp., the emergency light service breaker, 450 amp., and the breaker for emergency power, 300 amp. All are 3-pole carbon circuit breakers with inverse time limit, overload trips.

Three No-Fuz panelboards are built into the switchboard. One is for emergency circuits, one for certain local circuits and one for plugging outlets on exhibition and auditorium floors for temporary lighting extensions to exhibit and demonstration booths. Certain panelboards which control group lighting are remote controlled from push button stations in different parts of the building. For each of these a 3-pole contactor on the rear of the switchboard is bused directly to the feeder switch; corresponding pushbuttons with pilot lights on the face of the board provide for local control.

Lighting panels are also of the No-Fuz type with individual circuit breakers, non-closable on overload, and they are bused 3-phase. The small breakers are in two vertical rows, the upper one-third being on one phase and the remainder in each row on a different phase. This arrangement permits the use of standard width cabinets, but it requires more care in connecting circuits to insure that no 4-wire branch circuit has more than one hot wire per phase.

Now we come to the most interesting part of the job, the stage. It has quite restricted wings and has no recess into which the stage board may be partly set, giving access to the back of the board. The requirements are further complicated by the two opposite prosceniums and two different and independent lighting systems.

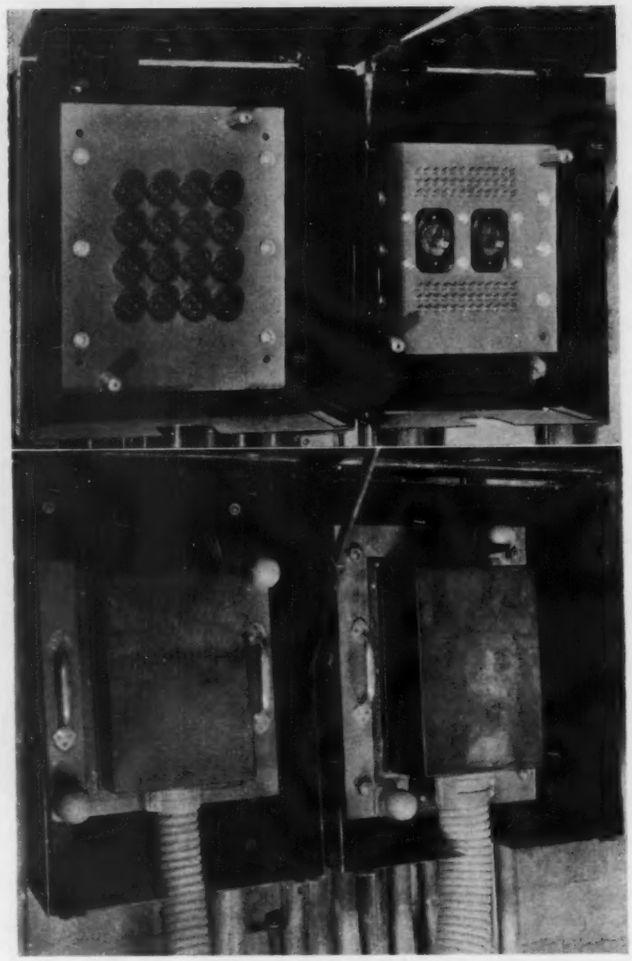
As originally planned in the architect's office, the stage board was to have been of the composite multi-preset pilot type mounted on a transverse balcony. Such a switchboard would reach from proscenium to proscenium, and the face of the switchboard balcony would have been nearly in line with the proscenium openings. The obvious disadvantages of this scheme, plus the difficulty of masking the board and the inconveniences of operation, made it imperative to seek some other plan.

The deficiency of space and the considerable distances from main switchboard to stage and from stage to major loads pointed to some sort of miniature remote controls on the stage, with the dimmers nearer the load centers. A basic revision was planned by designing a specially-arranged board of thermionic type, having remote vacuum-tube controlled reactor dimmers located nearer the load centers, these dimmers to be remote controlled from fixed and portable pilot boards on the stage.

This thermionic pilot board is in three separate sections. At each of the opposite prosceniums is a house-lighting pilot board, one for the main auditorium and one for the concert hall. These are permanently, but flexibly, connected and are on rubber-tired castors to allow limited movement and for access to the rear.

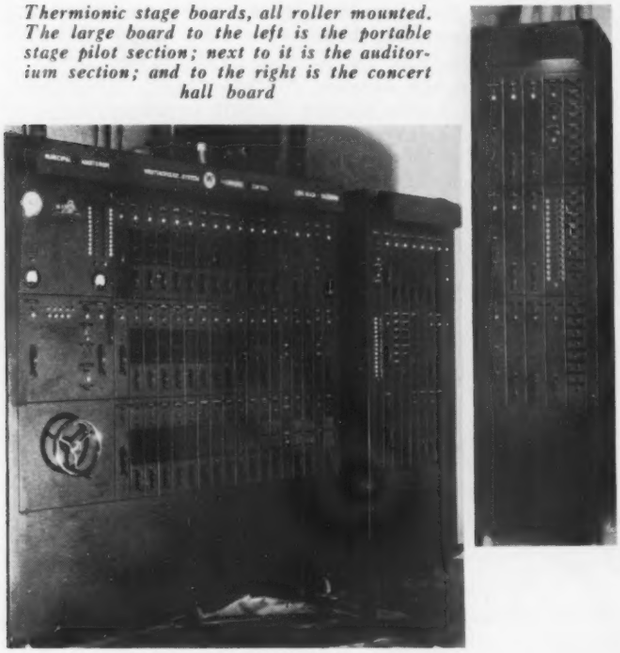
The third section is for stage lighting and is entirely portable for use adjacent to either house control board. This stage section is about the size of a standard upright piano and is equipped with two multi-point plugs on flexible cables for plugging in at either proscenium. The stage section is a ten-scene, multi-preset pilot board with rehearsal control. The house sections have no presets, but from a single pilot switch they may have their master controls transferred to the stage section.

The total length of all three sections is less than one-third of that required for the composite pilot board designed for the same duty. The auditorium house board is 33 in. long and controls 110 kw. in 127 circuits; the concert hall board is 20 in. long and controls 67 kw. in 75 circuits; and the stage section is 82 in. long and controls 250 kw. in 240 circuits.



Multi-point receptacles for plugging in the portable stage board: top, open; above, with plugs in place. The left-hand box is for 120 volts, a.c., for all worklight circuits on the stage; the right-hand box is for 30-volt d.c. tube and control connections

Thermionic stage boards, all roller mounted. The large board to the left is the portable stage pilot section; next to it is the auditorium section; and to the right is the concert hall board



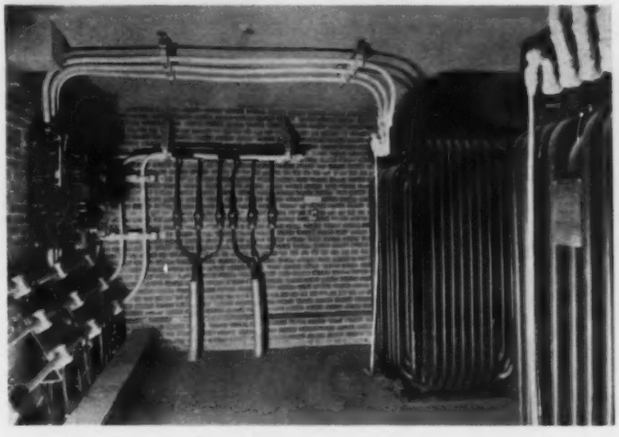
Miniature pilot switches and lamps are telephone switch-board items. The dimmer handles are relatively small and operate finely-wound potentiometers similar to those for radio use and for controlling currents of like magnitudes. Groups of small vertical sliders on the panels of the stage section operates the 12 potentiometers which comprise the ten-scene individual dimmer presets. They are master-controlled from push-buttons on the master panel in such a manner that any preset scene may be flashed on at will or any preset scene may be faded gradually into any other by means of the handwheel.

Reactance dimmers and the accompanying tube units are entirely offstage and in a separate room. Here also is the motor-generator set to supply 30 volts d.c. for tube and control current, and 200 volts d.c. for plate voltage on the tubes. The reactors for the main auditorium lights are in a reactor room under the upper balcony near the rear of the auditorium. They are in an almost direct line between the main switchboard and the load center in the attic, and receive a.c. power from a feeder direct from the main switchboard. From each auditorium reactor a sub-feeder runs to the branch dis-

tributing panels in the attic. From the auditorium reactor rack to the stage, over 400 ft. distant via the conduit route, is the 30-volt d.c. small control wiring for grid voltage to 14 radio-type amplifier tubes and for a few small contactor coils.

In other articles published in ELECTRICAL WEST, the operation of the dimming control in various theaters* has been explained. The operation of this system is not sufficiently different to warrant an explanation, except that an idea of the relatively small change in control current at the pilot board necessary to effect a corresponding change in lamp current may be obtained from the knowledge that the ratio is greater than 1 to 2,000,000 for some of the circuits. The individual reactors vary from 900 watts to 16.4 kw. in capacity.

The arrangement of controls on the pilot boards was made quite similar to that for stage boards of customary design in order to facilitate the work of the stage electrician. The stage control wiring was planned so that when the portable pilot board is moved from one proscenium to the other, the arrangement of control for borders, pockets, etc., is reversed at the board. No matter which side of the stage is in use, the front border and the front pocket are always No. 1, and so on.



Transformer vault containing two 300-kva. units, with dual network protectors mounted on walls. Dual service is furnished from a secondary network system

Of the stage lighting itself, a brief description was given in the caption to a picture of the stage. However, the footlights deserve more detail. They are made in ten removable, portable sections, each 54 in. long and containing nine individual reflectors for 150-watt lamps, three per color per section. The mechanical construction is such that these are usable either as single-row or double-row footlights by a simple adjustment of the covers, or they may be closed with a cover flush with the stage floor. The sections plug into a permanent raceway and those not in actual use may be removed for use elsewhere, since each section has adjustable hangers for hanging on scenery, battens or trees. Unused sections may be stored and protected beneath the covers. The initial equipment is a double row (twenty sections) for one side of the stage and a single row (ten sections) for the other side. A permanently-wired raceway in the trough carries color-marked receptacles for all sections and for foot spots.

It is believed that this is the first practical double-row disappearing footlight to be built and there has been much favorable comment on the multiple uses to which this equipment can be placed.

Another feature not previously mentioned is that a special retainer was devised for the glass and color frames of the border lights to insure them against coming out accidentally when the borders are reversed.

In addition to public telephones throughout the building, a 25-station intercommunicating system with an automatic exchange has been installed. A complete conduit system is provided for the permanent wiring of a complete public address and loud speaker system. When this is completed, headsets will be connected in certain rows of seats in the auditorium and concert hall as an aid to the deaf.

Accommodations have been made for two telegraph offices for use during conventions, and a special fire alarm system, connected into the public alarm system of the city, also is a permanent feature.

To the electrical contractor, Baty Electric Company of Long Beach, must go a great deal of commendation for the care and thoroughness with which the installation was made and for its successful operation. The main and stage switchboards, panel boards, power boards, transformers, network protectors and meters were supplied by Westinghouse Electric & Mfg. Co. The special lighting for the stage, auditorium, and concert hall, and the concealed types used elsewhere, were made by C. W. Cole & Co., of Los Angeles. For the writer, the variety of problems presented and the opportunity for practical ingenuity in planning many of these features has made the Long Beach Auditorium a most interesting assignment.

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Add Boners

IN ONE of the cities on the coast, some new ideas on electrical circuits and the wiring therefor were introduced in the answers to a recent examination by an applicant for the position of deputy electrical inspector. The spelling and punctuation (or lack of them) are the authors'.

It is very necessary to reduce the line voltage when starting a slip ring induction larger than a 15-hp. motor for the simple reason in starting any kind of machinery that requires power it is essential that the power be reduced so that it may not draw too much elcetricity and cause an excess amount of heat which may cause a fire hazard; also it causes a overtaxing of the motor and a unnecessary strain on the motor wire and machinery.

The requirements for all splices and joints conductors shall be such that no electricy shall escape or cause a arck in other words the splice should be such or made such in this way propery scraped cleaned put together the ends wraped around each other and saudered firmly.

A elector conductor is that part of the wiring system that carries the power or current to a given place with the least resistance.

Circular mil is that part of the electricity that returns to the power plant to be used over again and according to statistics it is a very, very small part at the present time.

It is permissible to install single conductor armored cable when the load on the wire does not exceed 120 amps. and then only after it is properly geared and covered to prevent any metal coming in contact with it.

(In answer to what size service would be required for a load consisting of the appliances listed.)

1—10,000-watt range equals 150 volts
1—3,000-watt water heater equals 50 volts
1—4,000-watt 230 volt 2 wire air heater equals 80 volts
6—lighting circuits equals 60 volts

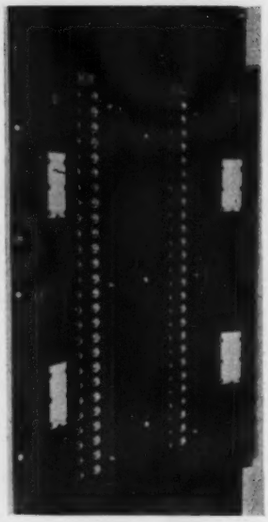
The required currant carrying capacity of a 3 phase 220 volt feeder supplying one 50-hp. & two 25-hp. motors 90% efficiency & 85% power would be about 160 volts.

Fuses may be arranged in multiple when the voltage does not exceed 120 volts.

* Los Angeles Theater, Jan. 1, 1932, p. 32; Oakland Paramount Theater, April 1, 1932, p. 176; Denver Theater, July 1, 1932, p. 22.

Above, left—The new chapel, with ancient, beautiful, stained-glass windows, lighted from behind by reflector strips; the old Spanish altar floodlighted from a cove

Above, right—Spacious art gallery, with rear wall lighted from reflectors niched in the adjacent ceiling beam, and two levels of convenience outlets along each wall for individual picture lighting. At right, the 104-circuit panel for art gallery wiring, including ornamental wrought iron ceiling fixtures. Switch control is provided in another contactor panel at the other end of the hall



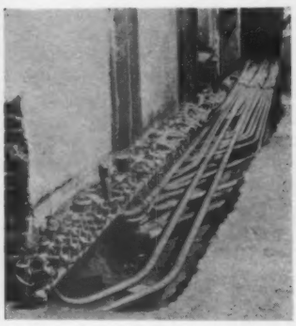
Famed Mission Inn Addition Is Red Seal

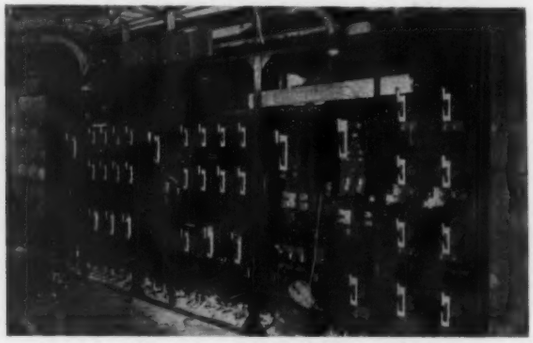
Riverside's Historical Hostelry Builds With Adequacy to Safeguard Its Art Treasures Throughout the Ages to Come

Rotunda Internacional, running the full five stories of the annex building; lower floors are used for shops, offices, commercial uses. Top floor consists of bungalows, each electrically heated, looking out on fountain, court and city. An electric elevator, clear glass doored, gives a view of the rotunda to its passengers

ONE unit at a time, Frank A. Miller, during most of his lifetime, has been building the Glenwood Mission Inn, at Riverside, Calif., into one of the most interesting hostelries as well as a museum of mission and Spanish relics absolutely unique in the world. Architect G. Stanley Wilson, designer of the newest concrete and tile unit, soon saw the advantages of a commercial Red Seal electrical installation for a building destined to live through the ages and provided extra adequacy, some offices having as many as 14 ceiling outlets, 10 duplex convenience outlets per room, radio outlets as well. Electrical Superintendent Young, of the Wurster Construction Co., took pride in installing the job in keeping with the permanent character of the institution he was helping to build.

Below, right—The new dead-front switchboard being installed to serve this new unit, introducing central station power to the building. Below, how feeder risers were bonded for grounding and rigidity before concrete pour





Voluntary Suburban Inspection Will Help

By ARTHUR KEMPSTON

Engineer, National Electrical Products Co., San Francisco; formerly electrical inspector

IN ALL parts of the country, electrical inspectors are being dismissed or reduced in salary because of curtailed building operations. Attempts at reinspection of old work are not successful, as a rule, largely because such efforts have the appearance, at least, of an attempt to create work by finding fault with electrical installations, which, so far as the user is concerned, are giving satisfactory service. Hence, there is such a strong resistance, sometimes political, to such efforts as to almost nullify them.

At this time there is more building activity outside the incorporated areas of towns and cities than within. None of this electrical work is inspected, yet many of the buildings now being built "just over the line" will be incorporated into the town or city in a few years.

The established electrical contractor in the city figures the wiring on these jobs, but seldom gets a contract because his price is too high. He and his wiremen work on the basis of the rules and regulations which insure a safe installation, whereas the non-registered contractor working outside inspection territory usually does a poor standard of work and has no regard for rules.

It is suggested, therefore, that electrical inspectors in the smaller cities obtain permission from their councils or other governing bodies to inspect outside the incorporated area of their cities—ON REQUEST OF THE OWNER OR BUILDER.

Such inspection would carry no legal authority, it is true, but the owner or builder's specifications requiring a "certificate of satisfactory inspection" of the electrical work would compel the contractor to produce such a certificate in order to get his money.

The inspector would enforce exactly the same rules and requirements as prevail in his city. The contractor would file exactly the same report as used for a city job. The wiremen would work just as they are expected to do in the city.

Fees would be the same and would be deposited with city funds to the credit of the electrical inspection department. These additional fees, in many cases, would be sufficient to prevent further decrease of staff or salary.

Local registered contractors, local wiremen, architects, builders, fire insurance agents, fire departments and all those interested in safety and good homes would support the plan, if it were properly explained to them. It would cost the city nothing, the contractor nothing, the owner only the inspection fee (which would be insurance of a safe job) and the city would be assured of a more uniform and safe standard of wiring in suburbs which some day may be annexed. At all times poorly-wired homes in unincorporated areas are a menace to surrounding homes in incorporated areas should a fire start. The owner or builder would get just as much competition on the job, but the standard would be higher.

This plan is best adapted to smaller cities. If successful there, it might result, when conditions again are normal, in the appointment of county electrical inspectors.

Neither organization, funds nor salaries are needed to start such a plan. The initiative must come from the inspector himself. He can interest all those concerned, if he really believes in the plan, and in a short time, with effort and the assistance of others in the industry, can start its operation. The entire matter is a volunteer effort; because it must be sold to people, it also should prepare the inspector to better sell his inspection service to his own city and its people. One of the best guarantees of the permanence of his position will be found in how well he keeps his community sold on the value of inspection.

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Electrified Olympiad Breaks Timing Records

By R. E. LLOYD

Foulkes Electric Co., Los Angeles

UNBELIEVABLY well organized, so well so that no detail was overlooked and every event was run off with clock-like precision, the Xth Olympiad at Los Angeles broke many records of long standing. One of the factors in the success of the undertaking, the electrical equipment, likewise was of record-making character.

Old timing methods, relying on human faculties, gave way to the Kirby two-eyed camera, accurate to a 1/100 of a second. A specially built, high speed (slow motion) movie camera, exposing eight times as many frames per second as ordinary cameras, incorporating a 200-cycle, tuning fork clock, it is started remotely by electricity from the starter's gun, and, as the runners near the finishing line, exposes moving picture film on which are shown not only the runners but the exact time at each exposure. The camera is set for operation by means of an order phone interconnecting between start position, finish line and field manager. In a 100-yard dash, the runner is timed to a precision of four inches, instead of over a yard with stop watch methods. The camera is elevated on a metal ladder in order to provide elevation so that runners will not blank each other on the film.

Below the press stand a temporary telegraph stand was installed below and around which 232 Dow-Jones ticker tape machines were installed, printing all information for press and visiting notables. The sending equipment in the press stand also operated similar tickers in the metropolitan area of Los Angeles.

The former public address system, re-installed at the swimming and diving pool, was replaced with a new Western Electric system, including amplifier panels, rectifiers, receiving panel, mixer panel and, at the west end of the field, a steel mast supporting 23 No. 555 receivers arranged in a double circle. Plug-in outlets for microphones were placed everywhere in the stadium, almost, as well as in the underground manholes in the field. (See EWEST, May 1, 1932, p. 232.) Microphone positions were also arranged at the main entrance and at the special section reserved for Vice-President Curtis and his party.

The field manager's stand was located at the southwest corner of the field, over the tunnel through which the athletes entered the field. He was connected by telephones to the order-wire circuit of the timing system, and also to the announcer at the public address mixer panel.

Cutting Costs by Raising Power Factor

By EARL E. THOMAS
General Electric Co., Los Angeles

UPON THE announcement by the Southern California Edison Co. in 1931 that they would allow a rebate for improved power factor, the California Fruit Wrapping Mills, at Pomona, Calif., became interested in modernizing its plant and improving the power factor. This plant manufactures tissue paper which is used for wrapping oranges, grape fruit, lemons, and other fruits. The plant consists of two paper-making machines, five Jordans for handling pulp, seven beaters, together with printing, cutting and other accessory equipment.

Total connected horsepower exceeds 3,800. The kilowatt-hour consumption per year is approximately 4,000,000, with a power bill which averages $40,000 annually.

After a careful survey which included tests with curve-drawing wattmeters and power factor meters on the larger motors, it was determined that the power factor of the plant varied from 44 to 80 per cent when lightly loaded and heavily loaded, respectively. From a study of the equipment it was found that, by substituting synchronous motors for several of the induction motor drives, the plant power factor could be raised to unity; conservative figuring indicated that at least $3,600 could be saved in the annual power bill by taking advantage of the power factor rate. This figure was arrived at after a consideration of all factors, including irregularity of operation.

Changes recommended included the substitution of synchronous motors of the same rating for two 150-hp., two 50-hp. and four 75-hp. induction motors. The addition of this synchronous capacity would be sufficient to raise the plant power factor to unity as long as the major equipment was operating. Acting upon these recommendations, the company purchased two new 150-hp., 428-r.p.m., 0.8-power factor, synchronous motors for driving two of the Jordans; two 75-hp., 428-r.p.m., unity-power factor, synchronous motors for other Jordan drives, and equipment for changing the four 75-hp. induction motors into the synchronous type.

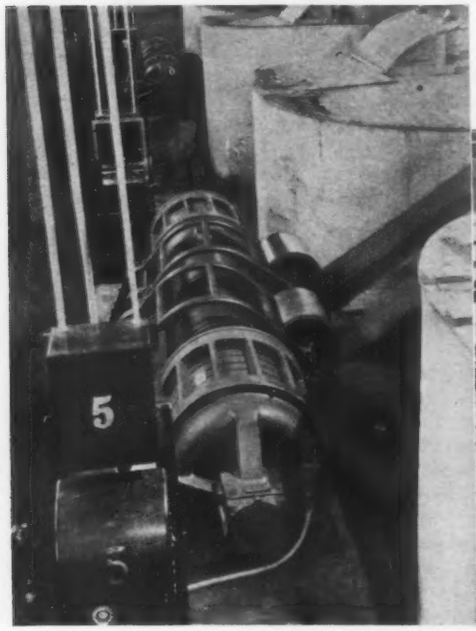
It is interesting to note that the stators of the four 75-hp. motors, without change, were satisfactory for synchronous motor operation. Salient pole rotors with new end shields were substituted for the squirrel-cage rotors originally furnished with the motors, thereby obtaining 300 hp. of synchronous capacity at but a fraction of the cost of new synchronous motors.

Supplementing this modernization program, the company purchased a new Jordan, which was equipped with a 150-hp. synchronous motor drive (duplicating the two mentioned) so that the new equipment included five synchronous motors and four reconstructed induction motors, a total capacity of 750 hp.

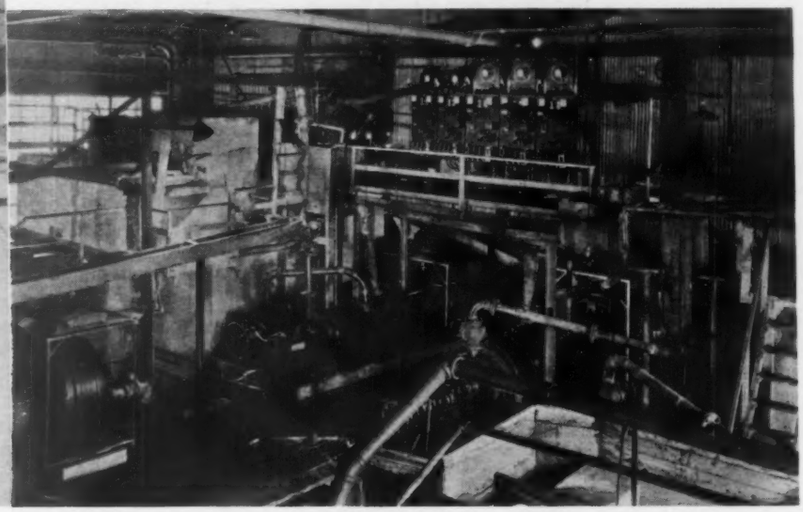
Additional equipment necessary for the synchronous motor installation included two 28-kw. motor-generator sets, one of which was used as a spare, one curve-drawing wattmeter, one curve-drawing voltmeter and one maximum demand meter with adjustable contacts. The instruments were considered necessary in order to insure that the plant power factor would be held as near unity as possible.

The recommended changes would cost slightly over $14,000 and, according to the calculation of the General Electric engineers, would save approximately $4,300 yearly on the basis of the performance during the pre-

Below—Four 75-hp. motors which were changed from induction to synchronous type by substituting salient pole rotors for the conventional squirrel cage rotors. Stators were satisfactory for synchronous motor operation without change



Below—Jordan equipment in the California Fruit Wrapping Mills, now being driven by synchronous motors instead of induction motors as the result of a modernization program which has returned 37 per cent on the new equipment investment. The five panels shown in upper center are automatic starting equipment for new motors



vious year. This was composed of $1,350 from increased efficiency and $2,960 from improved power factor, but was scaled down to the conservative estimate of $3,600 mentioned.

On a basis of a prospective 26 per cent annual return on the investment of $14,000, the executives authorized the purchase and installation of the equipment. During the eight months of continuous operation since its installation, returns greatly have exceeded the original estimate. This has been due to the fact that the plant has operated more hours than in previous years, but indications show that 26 per cent was a very conservative estimate of the return from the program. Average plant power factor has been maintained at 99.7 since the equipment went into operation and the actual return on the investment, including installation charges, has been in excess of 37 per cent.

In correcting power factor, it is never advantageous financially or otherwise to correct the entire plant power factor beyond unity so as to have a resultant leading power factor. It is always desirable, however, although occasionally not economical, to correct the plant power factor up to unity. Although in many cases it is more economical to stop at or correct to 85, 90 or 95 per cent, in this instance it certainly was advantageous to correct the total power factor to unity.

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A Department for the Industrial Electrical Contractor — the Motor Specialist

MOTOR FORUM

An Exchange of Ideas on Economic Electrical, Mechanical and Business Problems

The High Cost Of Selling

Ambition to Do the Super-Job Blinds Commercial Executives to a Fundamental Principle That Distribution Should Start With the Consumer and Work Back Through Dealer to Set Production's Pace

As outlined to the editors

By FRANK E. BOYD

Vice-President and General Manager
Pacific Electric Motor Co., Oakland, Calif.

BEFORE going into the details of dealer distribution costs and margin necessities to cover overhead, suppose we take a backward glance at the entire subject of distribution. A background, against which to focus attention on the details of the immediate foreground, often is necessary. Too much close eye work on immediate details blurs the perception as to some of the forces in the background which have made these details what they are today.

Everywhere there is talk of the "high cost of selling," that production in this nation has been solved, but that distribution is still a mystery, and similar expressions which register only bewilderment and not intelligence. From the point of view of one right on the distribution "firing line," there are many things which are done just in the reverse order of their importance. For instance, in fitting a motor to a piece of work to be done, we never would proceed in the manner in which manufacturers do to fit their production to the market. If we did, this is what we'd do:

Never go near the work or machine to be run. Just look at it from a distance, get a lot of statistics as to population, curvature of the earth and specific gravity of water supply. Juggle these in some mysterious manner and arrive at a figure which would be the size of the motor. Send the motor C.O.D. and then bombard the user with letters, folders, pictures and radio talks to convince him that there is a great future to this motor and that it can do four or five times more than is expected of it.

If the bewildered user protested that he couldn't use a motor that size, that it didn't fit his machinery, we'd just ignore his complaints and keep sending him more propaganda. "After all, all he needs is a good selling job." We'd even get men to go around and try to sell him more of the same kind.

Ridiculous, of course. But no more ridiculous than manufacturers' market analyses and production schedules and advertising ballyhoo today. Are any real factors learned from the actual field, such as the size of the job, what load it can carry, how fast it can accelerate? Is the dealer consulted as to his possible selling capacity, his known market, his cost of serving it? Not to date.

Manufacturers somewhere fell into a "super-job" ambition. Some of them have had a "dominate the market" phobia. Just because a dollar in production could be saved by making ten times as many motors as previously, they blinded themselves to the two hundred dollars extra that it would cost to distribute each motor once made. "Just advertise them more—that will sell them."

Now, I am a firm believer in intelligent advertising. We use carefully planned advertising. But I realize only too well that it won't work miracles. Moreover, advertising which overshoots its goal, promises glittering marvels, is doing advertising itself, as a means of selling, more harm than good.

To anyone of sober sense, much advertising is just plain buncombe. Pick up any magazine and read the drivel presented in it. If this depression has demonstrated anything, it is that manufacturing production and sales campaigns built upon "ballyhoo" are unsound and will collapse. Factories geared up to produce all that the optimism of the advertising would lead the executives to believe are bound to accumulate surplus stocks which sooner or later will shut them down. Goods can't be sold any faster than the market will absorb them. Advertising will stimulate the market to a certain extent, but it won't create customers out of thin air and "horse feathers."

Editor's Note—Fifth of a series of studies on the Economics of Motor Distribution, other articles appearing in the Jan. 1, April 1, May 1 and June 1 issues.

Failing to get from regular dealer distribution channels the accelerated selling they are geared up for, many manufacturers have short-circuited their dealers by means of any of a dozen or more subterfuges. Especially is this true of big equipment. On cable, for example, dealers get no protection whatever. The customer might as well buy it direct. The same with switchboards. Consulting engineers have been told to and do advise clients to buy direct. The contractor gets only the labor of installation for handling it. And yet he must assume grave responsibility in the erection of that board or the pulling of that cable. Suppose anything happens to damage these during construction. Is the contractor not justified in his claim for a margin whereby to recompense him for the risk he takes in handling, erecting and guaranteeing performance of the equipment?

Another phase of the same situation is the manufacturer's own advertising messages. Recently we were asked to mail out blotters regarding a certain accessory. Space was left on the bottom for our imprint, but the entire message on the blotter was not in our interest. "Put your control problem up to the Whoosis Manufacturing Company engineers. They have the RIGHT answer," was what we'd get for our pains and postage. Little of the advertising being done in publications reaching industrial plants, factory executives or engineers makes any mention of the franchised or authorized company dealer and his service. Practically all copy invites a direct deal with the manufacturer or his service shop.

Throughout the attitude of the manufacturers towards dealers runs a thread of fear that dealers may become a strong influence in distribution. This is in direct contradiction to the avowed expectations of the manufacturer as expressed by the late Fred M. Kimball, of the General Electric Co., at an Electragist convention. The dealer, he said, "must have sound credit, good business ability, technical knowledge, high character and recognized standing in the community, a definite place of business, make the exploitation and sale of motors a constant and major part of his activities, be on the job at all times and cooperate with the manufacturers' representatives, do his bit locally, advertising not only his business, but the products of the manufacturers he represents, carry reasonable and adequate stocks to care for the urgent needs of his customers, maintain a repair shop, and thus be able to conduct a PROFITABLE business."

Let the manufacturer ask himself whether a dealer can qualify to these requirements and NOT be considered as an influence—a real influence in manufacturer policy too, if you please. Mutual agreements between manufacturers and dealers are mutual only if the manufacturer agrees to accept some obligations on his part.

The time has come for big concerns to abandon the idea that they have private preserves for their own business hunting. Large business cannot exist without stable small business. The manufacturer who serves his dealers best will profit most—to borrow the Rotary slogan. In a like manner, the converse is true.

One-Way Dealer Relations

What is needed is a thorough debunking of "dealer relations." So far, "dealer relations" is pap, soft soap. Some of the manufacturers who advocate frank relations from dealers most avoid this same frankness on their own part. What would constitute genuine dealer relations would be to encourage dealers to take part in manufacturer policy deliberations. The Electragists have for years encouraged manufacturers, wholesalers and public utilities to take part in their deliberations. Might it not profit the N.E.M.A., likewise the N.E.W.A. and N.E.L.A., to seek the ideas of the Electragists at their conventions? Why should not N.E.M.A. have a real department of dealer relations, really seeking to find out what will help to make dealer business profitable, seeking from dealers their intimate, close-to-the-ground knowledge of markets, sales possibilities, trade trends and local economic conditions?

The manufacturers might ask themselves why dealers have proved unsatisfactory distributors. If they sought the real truth, no doubt they would find the difficulty not due so much to the shortcomings of the dealer as to the lack of good business **incentives** offered by the manufacturer. Instead of telling dealers what and how to sell—from 3,000 miles away—they could do no worse and might do better if they truly sought dealers' ideas on what the trade wants and what they can sell and how to sell it.

We dealers cannot help but suspect that manufacturers just make products blindly and then try to force them on the market, whether it likes it or not. We sometimes feel that they must be so carried away by their own propaganda and success, riding on the crest of a wave of prosperity, that they essay to tell dealers how to run their businesses, something the manufacturer knows nothing about.

Champagne Ideas for Bare Markets

A recent example or two is very graphic. Motor dealers of a certain manufacturer recently were advised of a wonderful idea in a card-file accounting and prospect system. The system was a credit to any highly-advertised sales counselor and would be very valuable, but the great difficulty with it lay in the fact that few dealers could afford to install or operate such a system, and certainly not on the margins allowed on motors.

A dealer in the country told me of a young jobber salesman who called on him. This chap always urged him to get a better cash register, told him the kind he'd get—one which was a self-accounting system. The dealer always answered that his little business didn't justify it, couldn't support it.

Some months later the jobber salesman went into business for himself and had the cash register of his heart's desire. Within a year he was broke, and one of the items of overhead which had contributed to it was the amortization of this super cash register.

Theory as to distribution, as opposed to actuality, often is that way. If a manufacturer would establish his budgets of markets based on what the executives of his dealers saw rather than on the optimism of either the dealer's or his own commercial men, (who are making budgets which will please the boss, rather than those based on true conditions) many of the big executives of industry today would not be faced with the financial problems of the present. Their plants would not have been geared to the overproduction which has contributed to the depression, if they had sought basic information from their last outposts—the dealers.

Nor would the tendency to project sales quotas up an ever-ascending curve, regardless of circumstances, have become such a habit. Because the sales records of the past years indicated a gradual rise in sales of certain commodities is not sufficient reason to add 10 or 25 per cent expectancy to it next year and to attempt to achieve that quota. For a few years it can be done, but not forever.

For some time, manufacturers have decried the burden of the cost of handling the large number of small orders which come to them. They do not realize that

an invitation on their part to the customer to come to them direct implies their willingness to serve him on bolts and nuts and spare key stock. The manufacturer would like to pass this small business more completely over to dealers—because it is profit eating—but he refuses to recognize in his margins to dealers enough profit to assume the burden which manufacturers themselves have found insurmountable.

It might be remembered that the first rule of business is to sell for more than cost—not overlooking the fact that cost includes overhead expense as well as the primary price paid for the goods.

It is argued that dealers, given more margin, cut the price. Dealers selected according to Mr. Kimball's specifications, dealers of good credit rating, do not cut prices. The difficulty is that manufacturers are not satisfied to select only dealers of good credit rating. The mania for volume has afflicted them. Their producing machinery is geared up to volume. "Go forth and bring in many outlets, regardless," becomes an implied direction to district offices. These hastily added outlets are the ones who cut prices. It is a case of trying to eat the cake and still have it.

Reducing the Diet

How then can the high cost of selling be reduced? How can the manufacturer reduce his sales expense? According to E. O. Shreve, of the General Electric Co., at an Electragist convention, "The cost of distribution has gone up by leaps and bounds; we are living in a fool's paradise and we are giving services out of proportion to the cost of giving such services."

I do not believe that, with the clumsy, involved and extensive organizations now maintained by the larger manufacturers, the costs of distribution can be lessened materially. I do feel that manufacturers will have to lean more heavily upon dealers in the future, depending more upon them for distribution economy. At the present time, on stable items like motors and other unprofitable lines, the dealer is merely a friendly contact and an order taker. He is a real salesman, however, on specialties, on construction and shop business, on second-hand equipment—because these are profitable.

One large manufacturer recently opened a motor repair shop to service small motors used in an appliance. The price set for rewinds was so low that no motor dealer could compete with this shop. As a result we sent them all of our own small-motor rewind business. It saved us money to do so. Even with this volume, the unsoundness of the scheme collapsed it. This service shop has been shut down.

If the truth were known, I daresay most of the larger manufacturers' much-advertised service shops probably are operated at a loss. Yet it is doubtful if the real situation ever becomes known to the chief executives, since those in charge of such operations are anxious to maintain and build up an organization which will give them greater importance, regardless of the best interests of the company.

One company recently has declared that it intends to launch an aggressive drive to get business through its service shop. Probably it will learn, quickly and painfully, some of the stark truths of dealer problems, and gain more respect for the dealer's place in distribution.

Not satisfied with our word as to having combed the field thoroughly for industrial business, the manufacturer we represent recently sent a sales engineer into our territory to give it a more thorough fine-tooth combing. The results of this magnificent effort were so disappointing that it is doubtful if it could be regarded even as a noble experiment.

How much the manufacturers could gain by the abandonment of direct competition with their good dealers will never be known until it is thoroughly tried. Doubtless, they could give up even their service shops with profit to themselves, concentrating their efforts on building up their franchised dealers. Specialized work could be directed to specialized shops. Even a utility in one of our large cities finds it desirable and economical to give all of its transformer rewinding and repair work to a dealer, instead of running its own repair shop.

In our own experience we have found it impractical to install special machine tools in our shop. The volume of work would not pay for them in a lifetime. We find it better to farm such machine work out to local machine shops. After all, they are our customers too, and, moreover, it builds goodwill. The same principle could apply to all of the special repair business for which, presumably, these manufacturer service shops are operated.

They All Come Back

Distribution more and more reverts to intelligent dealerships. Even the automobile, the washer and the refrigerator manufacturers who wanted to exert control completely down the line have had to withdraw and revert to dealer policies. Some of the costliest mistakes of distribution have been made because manufacturers have wanted to dictate distribution down through each link of the chain. They cannot have brains and initiative in their dealers if the latter are subservient to a distant headquarters. More such mistakes will be made, doubtless, as long as the desire to dominate runs amok.

But certainly, in this recent collapse of inflated manufacturing schedules, sales budgets, advertising claims and egos, one lesson should have been learned—"We all have limitations."

We motor men never have been successful in fitting a motor to an unknown machine from an office desk and with the aid of "projected curves on the expectancy of the market." We have to see the machine, get its load characteristics, operating conditions, learn something of the processes for which it will be applied, the hours and stresses of work. Then we get or design the proper motor for the job.

When this same simple, sensible process is applied to distribution, we will have a lower cost of distribution and, possibly, fewer depressions.

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New Books

AMERICAN ELECTRICIANS' HANDBOOK, by Terrell Croft. Third and revised edition; cloth bound; 4x7 in.; 1,051 pages; illustrated. Published by McGraw-Hill Book Co., Inc., New York, N. Y. For sale by McGraw-Hill Retail Room, 883 Mission St., San Francisco. Price $4.—An encyclopedia of practical reference data on wiring and installation, already well known in its previous editions. This revision has been made by Clifford E. Carr, department of industrial electrical engineering, Pratt Institute, associate member, A.I.E.E., who brings the book up to date on new methods and materials of installation, National Electrical Code changes and more modern practices. It contains 200 pages of entirely new material, including 150 new illustrations. Contains only practical information set forth in simple language. An invaluable book to the electrical engineer, contractor and wireman.

ELECTRIC POWER EQUIPMENT, by J. G. Tarboux, professor in charge Electrical Engineering department, University of Tennessee. Cloth bound, 6x9 in.; 493 pages; illustrated. Second edition. Published 1932 by the McGraw-Hill Book Co., Inc., New York. Price, $5. For sale by the McGraw-Hill Retail Room, 883 Mission St., San Francisco.—Covering a broad scope, this book presents a view of the essential elements in the entire field of electrical power equipment. Chapters are devoted to each classification, such as generating equipment, power plant circuit layout, switching equipment, transformers, feeders, circuit breakers, transmission lines, substations, etc. In the second edition of this work is included a discussion of new types of circuit breaker mechanisms, metal-clad switchgear, and a revised and enlarged chapter on the economics of power generation, which includes depreciation and rate making. Problems are included on the work of each chapter and an appendix offers a number of problems whose solution requires a general knowledge of electrical engineering as brought out in the book.

At Sacramento, California's State Fair ground, the P. G. and E. Co. has erected a permanent outdoor exhibit of farm electrification. Above left, the cottage, which houses on its reverse side the stage for the cooking demonstrations, with the audience under an awning-covered area. Above, miniature farm buildings house the various farm electrifiers

Sell Electrification By Showing It At the Fair

All Farmers May Not Be From Missouri, But They Like to Be Shown Just How Electricity Can Do the Jobs They Have Always Done By Hand, Utilities Find

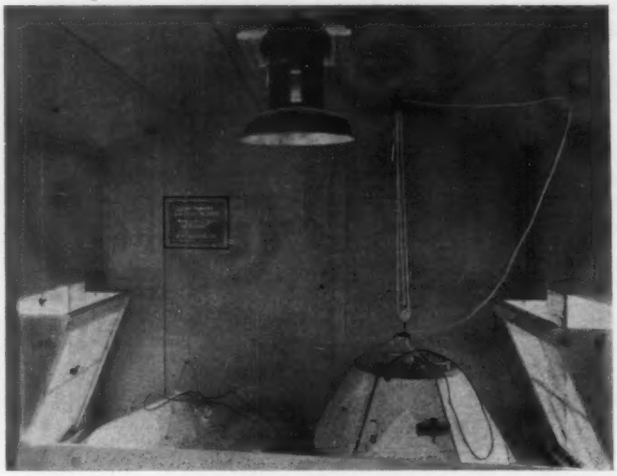
PERENNIAL crop of farming communities are county fairs, and sometimes state fairs; hardness of the times has little effect on their steady growth. After all, farmers are so used to hard times that one depression more or less, means little, so fairs, like brooks, run on forever.

Utilities and electrical dealers in communities which are chiefly agricultural usually make good commercial hay of these fairs by using them as a means to demonstrate to the visiting farmers the desirability of any particular apparatus. The season for such exhibits is here, during the harvest months of September and October, so the tale of what some utilities and dealers have done with respect to displays and demonstrations of farm electrification is appropriate and should be helpful in the planning and execution of similar exhibits.

Although the Pacific Gas and Electric Co. has had displays at the California State Fair, in Sacramento, for many years, it was not until last year that a permanent agricultural exhibit was built. It was staged then under the supervision of A. M. Frost, agricultural sales manager, and visited by 40,783 people. Practically the same exhibit and the same plan will be used this year during the fair, Sept. 4 to 11.

For the exhibit, several buildings were arranged on a lot 75x130 ft.; they included a model house, which was in reality the stage for cooking and domestic demonstrations, a pump house, a brooder house, a chicken house, a milk house and a cow barn. The model kitchen, with an exterior resembling a farm home, was the stage, back of which seats for 150 people were provided under an awning-covered pergola. With the lawn sprinklers in operation and the awning to provide shade, a cool and pleasant atmosphere was created and many weary fair visitors took advantage of the comfort provided. Here, at the bungalow stage and kitchen, equipped with ranges, refrigerators, water heaters and all manners of home appliances, domestic demonstrations were held at 10 a.m. and 3 p.m.

University of California specifications governed the construction of the milk house. On the outside was a milk receiver, from which the liquid food flowed over aerator coils; brine was supplied by a Frigidaire unit. Inside were a walk-in type cold storage box with room for four 10-gal. cans and some farm produce; a milk separator; and two types of sterilizers, one a hot water type, the other a steam type. This year, however, the walk-in refrigerator will be rebuilt to even more



Chicken house with electric brooders and ultra-violet lamp above. Chicks in this house thrived during the fair last year

modern specifications, obtained by the Committee on the Relation of Electricity to Agriculture after extensive field tests.

In the pump house were a 15-hp. irrigation pump and a domestic pressure system. In the brooder house were two electric brooders and an ultra-violet lamp. The chicken house, likewise built to U.C. specifications, was electrically lighted and time-switch controlled.

Three stalls and the milking machine were placed in the cow barn, and a feed house, in which was a 5-hp. hammer mill with a capacity of from 700 to 1,000 lb. of ground feed per hour, was in daily operation. Outside, on the lawn, was a larger (10-hp.) hammer mill equipped with a cyclone and feed mixer, the latter operated by a separate 3-hp. motor.

Although a hot bed, 6x6 ft., was made to demonstrate soil-heating cable, it was not operated because of the heat of the season. Attendants were on hand, however, to explain its use to the large number of interested visitors.

Equipment was furnished by the various manufacturers invited to display. These included: Westinghouse Electric & Mfg. Co., range; General Electric Co., range, refrigerator, water cooler, ultra-violet lamp, floodlights and soil-heating cable; Wesix, Inc., water heater and steam boiler; Pelton Water Wheel Co., turbine pump; Jaccuzzi Mfg. Co., pressure domestic water system; Lyon Electric Co., brooder; Woods Co., brooder; Frigidaire Sales Corp., milk-cooling equipment; Geo. W. Prising Co., sterilizers; De Laval Co., separator and milking machine; Stover Engine & Mfg. Co., feed grinder; John R. Gray Co., feed grinder; and Electro Static Products Corp., insect killer.

Sitting on the steps leading up to the cottage stage and demonstration kitchen are A. M. ("Jack") Frost, (center in grey suit) agricultural sales manager, and the district rural power representatives, who were hosts to the visiting crowds. Left to right, top row are: Paul Leverenz, San Jose; Paul Ford, San Joaquin, Stockton; S. J. Holsinger, Sacramento; T. A. Wood, North Bay, San Rafael; A. R. Gledhill, Colgate, Marysville; Charles D. Sublette, Sacramento. Lower row: W. E. Mumford, Sacramento; A. M. Frost; and Grant Cunningham, Coast Valleys, Salinas

Milk house, with milk separator and large walk-in type of refrigerator, erected in compliance with U.C. Agricultural College specifications. The cow stall and milking machine were provided in another portion of this small building. Two types of dairy sterilizers also were shown in this connection, as were milk-cooling coils and other dairy equipment

Lawns, buildings, wiring and piping were installed at the expense of the power company, the wiring being done by Buford Electric Co., Sacramento. Cows were provided from various herds on display at the fair. A number were milked every night at 5 p.m. and the milk put through the cooling process and stored, an operation which attracted considerable attention and for which many people waited every evening.

Two hundred baby chicks, each a day old, were put into the brooder house and remained under the ultra-violet lamp during the entire period of the fair. Many expert poultrymen commented, saying that the chicks had the appearance of being four or five days older than they really were. All were of uniform size and not one was lost during the entire demonstration. The stock was selected carefully prior to the display and sufficient information is not available to prove that their apparent unusual growth was due entirely to the lamp.

A 10-hp. hammer mill equipped with a cyclone and feed mixer, installed outside on the grounds, was a center of attraction

Hold School for Agricultural Salesmen

In advance of the opening of the fair, a two-day school was called for the 25 agricultural power salesmen of the company. Meetings were held at the exhibit and each contributing manufacturer was invited to discuss his equipment and to instruct the salesmen in its operation. This provided two important things: First, it acquainted the salesmen with all the details of the equipment; and, second, it afforded an opportunity to complete all the installation details and to test out the equipment for proper working conditions before the fair opened.

Eight men were selected from the agricultural sales

force to represent six of the most important agricultural divisions of the company. These men acted as hosts to the visitors during the fair. Programs describing each item on the lot and 10,000 cardboard fans carrying the P. G. and E. Co. invitation to visit the exhibit were distributed at the main entrance to the fair, as well as at the exhibit. More than 200 good prospects were secured and followed up later by the agricultural salesmen, cooperating with the equipment dealers in their territory in the sale of the equipment. Range and appliance salesmen also followed up range and water heater prospects obtained.

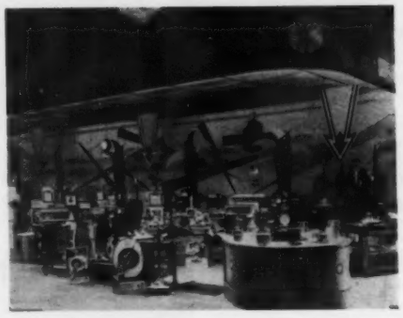
A particular item being pioneered last year was the hammer mill. The low price of this machine and the low operating cost made the direct solicitation by the company successful. With a hammer mill, the farmer is able to grind his feed at a saving of from $2 to $3 per ton above the cost of custom grinding, is assured of the quality prepared and is able to mix the ingredients according to particularly favored formulas.

Red Seal Home Display This Year

This year an added feature is to be provided at the exhibit. At the rear of the pergola where the audience sits will be placed a large board on which will be painted the floor plan used to show the convenience provided by Red Seal wiring. Instead of the symbols for outlets, etc., however, the actual material will be installed. A meter panel will be installed near the back-porch location for such a panel. Lamps will be placed where lighting fixtures are located. At the rear of the board will be shown the proper wiring, conforming to the National Electrical Code, and installed in a workmanlike manner.

It is hoped that, with this vizual demonstration of wiring, visitors to the fair will be impressed with the necessity for adequacy and, likewise, the need for correctly-installed wiring, as a safeguard to life and property. This will translate, for the layman, the usually hazy idea he gets from diagrams of wiring into a concrete and understandable reality.

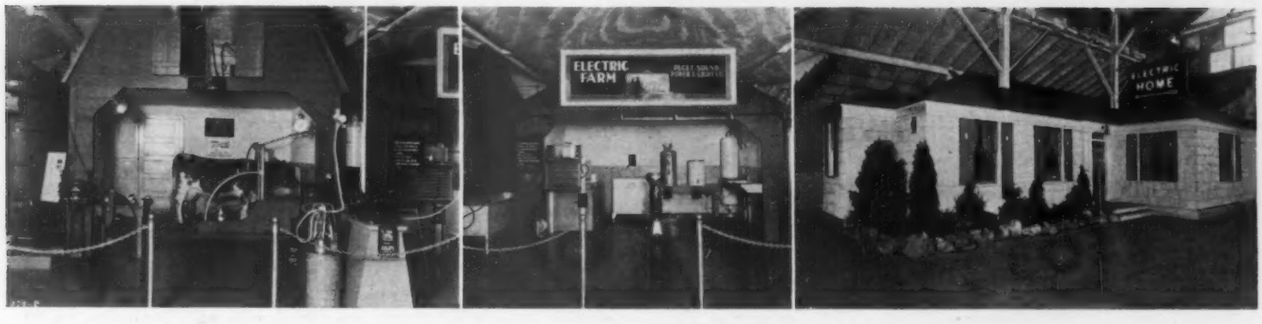
Above — Puget Sound Power & Light Co., permanent indoor display at Puyallup, Wash., fair, with booths depicting stump burning, hot beds, pumping, poultry farm uses



Right — Annually, the Valley Electrical Supply Co. displays a full range of appliances at a familiar and more or less permanent location in the Fresno county fair

Right — Southern California Edison Co. Ltd., while it has no permanent fair exhibits, displays at many county and agricultural meets. For a parade recently, in connection with a civic festivity, these two contrasting floats were used to tell the story of electricity's modernity

Below — More of the Puget Sound Co. exhibit, showing milking equipment, farm power tools, milk cooling and sterilizing equipment, and a complete model electric cottage, with all appliances in use in their proper settings

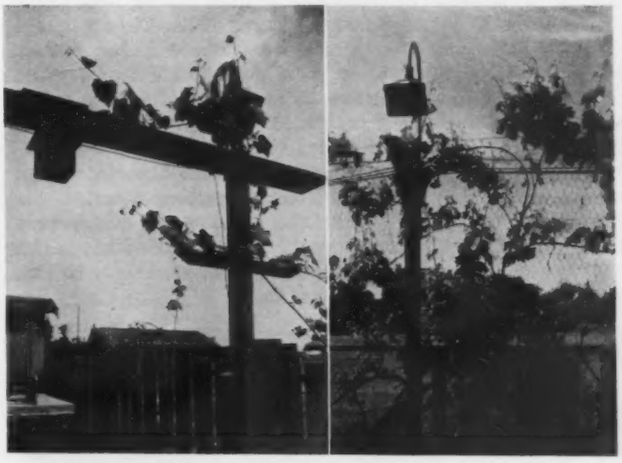


Above are two night views of the simple garden of Carl Wolf, Fresno, enhanced by lighting, an out-of-doors living area. Below are shown methods of mounting reflectors on pergola posts

Outdoor Living Rooms

Lighting Transforms the Garden Into a Brilliant, Colorful Area for Informal Dinners, Cool and Restful Lounging

Barney Rosenberg, proprietor of the Inland Lighting Co., Fresno, recently transformed his garden by placing miniature lighting standards about it. Day and night views of the same spot show the entirely new effect created by dark sky and artistically-lighted shrubs and trees. Many people spend much time and money in a beautiful garden, attractively decorated, but are busy during the day when they might enjoy it. Only lighting can make it useful to them during warm evenings



The secret of successful garden lighting, according to Mr. Wolf, Valley Electrical Supply Co. electrical engineer, is to mount reflectors some distance from the living area, so that insects attracted to the lamps will not be found near the floodlighted area in use. Thus a table, lighted from some distance, will be practically free from insects during a meal. Colored lamps on stringers in pergolas, or in ornamental laterns, give a festive touch to the general white lighting on green lawn and flowers

Fish pools, gnomes, and other garden decorations, in the lights and shadows of garden lighting, take on theatrical charm. At right, a luncheon table under a lighted pergola makes an ideal setting for evening meals in the relaxation and coolness of the out of doors. Lamps and reflectors are mounted at the eaves of the house

Merchandising Ideas From Yakima

SEVERAL good store ideas came to light during a visit to the Tennent Electric Co., of Yakima, Wash., where "Jack" Tennent is the proprietor and is assisted by Mrs. Tennent.

The first of these ideas is the attractive display of small appliances, as shown in an accompanying photograph. The appliances are arranged on six stands about 5 ft. long and 2 ft. wide. These are perfectly plain and can be made up easily by a carpenter at a small cost. Two sawed-out end pieces of planking take the place of legs, taking up the minimum of space in proportion to the table room provided. The stands are placed diagonally along one whole side of the store, a much more pleasing arrangement than if they were straight out from the wall, as one might expect to find them in a cafe.

Velvet throws cover the stands. On these the appliances are placed and, although open to inspection, they are never allowed to get out of place. The first table nearest the door is devoted to irons; tables Nos. 2 and 3 carry percolators; No. 4 has corn poppers; No. 5 supports toasters; and No. 6, the last, waffle irons. The customer coming in naturally gravitates to the table carrying an appliance in which she is interested and there she can examine the whole line.

Mr. Tennent is a firm believer in actual demonstration, no matter how simple the device, so he has arranged his ventilating fan and his bells and buzzers for demonstration. The fan is mounted in the partition leading to the back room, just as it would be in a kitchen. Here he can

Attractive display of appliances on stands in the Tennent store

show the customer just how it will work in actual practice, turning it over to be used as a suction ventilator or as a blower. He says that anybody could understand the action if the fan were shown on the counter, but that there is not the same interest attached to it as if it actually is in operation so the prospective buyer can try for himself, see how easily it works and actually feel the results.

In the same way, bells or buzzers have very little interest attached to them until they are mounted and connected up so that the prospect can push the buttons and hear the great variety of tones and volumes that there are to pick from.

If business does not walk into the store, Mr. Tennent believes in walking out after it. Recently he made a survey of the warehouses and fruit packing plants in the city and found that they were not provided with intercommunicating telephone systems. In order to sell them most effectively he rigged up a demonstrating set in a case easily carried about and containing two stations with the necessary batteries and wire so that he could go into the plant and set up a pair of stations at some distance apart in a few minutes' time.

"Jack" Tennent, left, shows how he goes outside of the store to sell inter-communicating telephone installations by demonstration

With this demonstrator set, he starts down the line with the foreman or floor superintendent and shows him how much time and how many steps such a system will save over the old-fashioned bell factory call. Then he gets his man to introduce him to the general superintendent and together they interest the latter. Finally, he gets to the head of the organization with sufficient backing to enable him to make the sale if it is at all possible.

Mr. Tennent also makes the most of his window displays. Perhaps the reason his business is so good is because he makes every bit of store space support a business-building idea.

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Chimes Ring in Both Customers and Prospects

FIRST thing a customer hears upon stepping into the Sunbeam Electric Co., store, at Santa Monica, Calif., is the melody of chimes. Stepping upon a rug placed immediately inside the door makes the contact that starts them. The last thing the customer hears upon leaving, likewise, are the chimes, a pleasant au revoir after a pleasant visit.

There are two motives in the proprietor's melodic idea: First, the foremost, to advertise the chimes; second, to notify the proprietor or clerk that a customer has entered.

"We see a big volume of future business in the proper promotion of residential chimes," says R. L. Doman, the proprietor of the shop. "I see no reason why they will not supplant the old-fashioned doorbell in most homes of the moderate and better class. If every customer coming in here and going out hears chimes, beautiful chimes, when business gets back to normal he is going to be thinking about them. I wish every electrical shop in the country would adopt our plan of popularizing them. Remember that if the visitor has to open a door or punch a button to make them ring, some advertising is going to be lost. The rug idea is best."

Letters to the Editor

*Forests and Stream Flow**

COMMONLY accepted theory has been that forests exert beneficial influence upon stream flow by storing waters and preventing their rapid run-off, by retarding snow melting and extending the period of run-off, by increasing precipitation and by preventing soil erosion.

During the period between 1910 and 1926, the U.S. Forest Service and the Weather Bureau conducted a study of two contiguous forest areas in the Wagonwheel Gas area in Colorado, one of which was deforested during that time. Similarly, between 1917 and 1930, stream flow measurements were made of various streams in the San Gabriel Canyon region of southern California, during the course of which (1924) forest fires completely denuded one watershed under observation.

Data from these studies have been analyzed, correlated, tabulated and plotted and the following conclusions developed:

1. Forests do not conserve the water supply of a watershed, because after their removal (in the areas under study) there was an increase in average annual yield amounting to 15 per cent in the Colorado area and 29 per cent in the costal mountain area of southern California.

2. Increase in run-off is not confined wholly to flood periods. In both the Wagonwheel Gap area and the southern California area, 52 per cent of the increase occurred during the non-flood period, due to subsurface storage. This increase results either from (a) increased subsurface flow and storage; (b) decreased transpiration; or (c) a combination of both.

3. The removal of vegetative covering increases normal flood heights.

4. The belief that forests or vegetative covering will increase summer run-off and shorten the low-water period through exercise of storage functions is a fallacy in so far as the two regions under study are concerned.

5. Coincident with the increase in summer run-off, there is an increase in the average summer minimum, and the period of low-water runoff is shortened materially.

6. In the Wagonwheel Gap area there was practically no evidence of erosion after deforestation. In the southern California area, complete denudation increased erosion due to increased surface run-off, but the second year after the fire new vegetative covering was nearly as effective as the original in reducing normal flood run-off, indicating that had this area been cut over without destruction of roots and tree litter, the erosion would have been negligible.

Editor, ELECTRICAL WEST:

I am taking the liberty of sending you a preprint of a paper delivered before the American Society of Civil Engineers at its annual convention held in Yellowstone Park on July 6. It is expected that this paper will be published as a part of the August proceedings of the Society, following which there undoubtedly will be considerable discussion printed in subsequent proceedings.

If the facts as presented in this paper have general application, it would appear that communities in areas where shortages in water-supply are becoming critical, will have to consider whether the value of forests and brush-covered areas for scenic, recreational, and timber uses is sufficient to offset the costly influence of a diminished water-supply and a poorly sustained minimum flow. Thought must also be given to the practicability of replacing heavy water-consuming vegetation with species that will maintain their beneficial aspects with a smaller water consumption.

The converse of this conclusion seems also true. In areas where water supplies are not critical forests may well be maintained for their timber value, scenic and recreational features, for soil protection, as an aid in lowering normal flood crests and for whatever part their creation and maintenance may play in the unemployment situation.

In other words, in the determination of the proper vegetative cover for any particular area, consideration must be given to the fact that forests, as such, do not possess all of the valuable attributes from a "water conservation standpoint" that have been attributed to them.

From the standpoint of stream-flow regulation it appears that the benefits of storage reservoirs are real and apparent while the benefits of storage through forests are not so evident. From the viewpoint of the water user, expenditures for the construction and maintenance of storage reservoirs seem more logical than similar expenditures for maintenance of forest cover over and beyond that necessary for soil protection.

The obtaining of an increase in annual run-off and summer and fall stream-flow does not necessarily imply deforestation or destructive denudation. In many sections of country streams which are valuable sources of water-supply flow through dense brush or tree-covered valleys. This vegetation has its roots in the water-table adjacent to the stream and transpires and evaporates large quantities of water. It appears that in many such areas the water-supply could be economically increased by pumping ground-water into conduits constructed across such areas, thus lowering the water-table below the effects of transpiration and evaporation. Operations such as described would result in deforestation of areas of little economic value without resultant erosion.

The authors of the paper can see no reasons for serious disagreement with foresters on the general subject discussed in this paper. The value of trees or brush-covered areas as a means of lowering normal flood crests and for soil protection is well recognized. Their detrimental effect upon total run-off and low summer and fall flow is demonstrated beyond a question of doubt. In this connection your attention is invited to the fact that, so far as is known, the experiments described in the paper are the only ones, either in this country or abroad, which include actual removal of trees from a watershed, and therefore it is the first time that the actual effect of deforestation could be determined with any degree of accuracy. The authors feel that their conclusions should be given more weight than conclusions based on inductive reasoning, which has been the basis of so much argument in the past.

W. G. HOYT,
Hydraulic Engineer,
U.S. Geological Survey,
Washington, D.C.

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*Abstract of a paper presented by W. G. Hoyt, principal hydraulic engineer, and H. C. Troxell, associate hydraulic engineer, U. S. Geological Survey, before the annual convention of the American Society of Civil Engineers, Yellowstone National Park, July 6, 1932.

Russell H. Ballard, Edison Company Head, Dies Suddenly After Relapse

RUSSELL HENRY BALLARD, president of Southern California Edison Co. Ltd., and one of the industry's best-known personalities, died suddenly at his Los Angeles home on Aug. 24, the victim of a relapse following an attack of influenza. He was 57 years of age.

His death, following within four months that of John B. Miller, founder and chairman of the board, leaves vacant the two ruling chairs of that organization.

RUSSELL HENRY BALLARD
1875-1932

Born in Hamilton, Ontario, on June 25, 1875, he came to the United States in his eighth year and was educated in the public grade and high schools. For seven years prior to his advent to Los Angeles, 35 years ago, he worked for Thomson, Houston Electric Co., in Chicago, and its successor, General Electric Co.

Mr. Ballard's sudden death was typical; in his active life, in his participation in his company's affairs and in his assumption of national industry responsibilities, he never was casual. He was a leader, not by reason of a swaying tongue and a smoothened manner, but because of a dominating personality.

In his years as general manager of the Edison company, he became more and more the confidante of many of his employees, whom he termed "fellow workers" and meant it. But the story of this employee confidence dates further back than that, to the days when he first became an employee himself, in 1897. The West Side Lighting Co. of Los Angeles was then a one-year old concern, and Mr. Ballard became its bookkeeper.

That period was the beginning of the period of consolidations among electric companies in southern California and, as company after company was acquired, the West Side company emerged as a large, cumbersome, poorly integrated utility system. It was then that Mr. Ballard assumed the task, under

An Appreciation

Russell H. Ballard is gone. In his untimely and premature passing, the electrical industry is called upon once more to mourn the loss of a great leader.

His whole life was dedicated to the upbuilding of the electrical industry. From an humble beginning as office boy in the Thomson, Houston Company, he rose to president of one of the largest independent operating companies in the world. It was inevitable that his outstanding qualities of leadership—courage, vision, tremendous initiative—should bring him Westward to California, where, in the creation of a far flung power system embracing thousands of square miles, those characteristics could have full sway.

His devotion to the industry, his faith in its future, his ceaseless energy and his sheer ability won for him the affection of his subordinates, the confidence of his colleagues and the esteem and support of the communities served by his company. He was a keen student of social and economic changes, and as such, held the firm conviction that the fundamental strength and progress of community, state and nation lay in the orderly development of a cheap and dependable supply of electrical energy. He believed that this progress definitely could be measured by the degree of service rendered to the public by its electric utilities, and by instilling inspiration, enthusiasm and vision into his own organization he built the great operating company which he headed.

Above all else he was a humanist. He once expressed his creed in these words—"Built upon the rock of service, the electrical industry must stand foursquare in the eyes of the public." Never did he permit his sympathetic contact with the public nor his keen understanding of the public pulse to be dimmed, although fame, fortune, honors, achievement and eminence came to him deservedly in large measures. Militant and fearless in face of attack upon the industry, he fought back against unjust criticisms by prejudiced or envious detractors.

His contributions as a citizen led him into all that was good in civic life. Many of his philanthropies will never be known except to the beneficiaries.

The electrical industry is greater and richer from the contributions he made to it. A vital, courageous, dynamic personality, he was a successful leader of men. What more fitting monument could he leave than the living, virile, spirited organization of men and women imbued with the comraderie, unity of purpose and ideals of service for which he himself stood.

the direction of his chief, John B. Miller, of going from plant to plant, from newly-merged property to newly-merged property, cementing employee relations with the parent company, welding together the (then) far-flung holdings and solidifying the group into the well-knit Edison system of today. It was one of his greatest contributions to his chief and to his company, and it gave him the employee perspective which proved invaluable in his future positions.

From bookkeeper, Mr. Ballard rose to auditor, to assistant secretary, to secretary; then, successively, he became assistant general manager, general manager, vice-president and general manager, executive vice-president and general manager (in 1924) and, in March, 1928, president and general manager.

He watched the West Side Lighting Co., with $500,000 capital, grow into the Southern California Edison Co. Ltd., with assets of more than $375,000,000, with 127,000 stockholders, and with a service covering 55,000 square miles. He aided in that growth.

In 1915 he became a vice-president of the National Electric Light Assn., the first Westerner to be so honored. In 1920 he became president. It was during his tenure that the present geographical divisions were formed; he was responsible for the appointment of Merlin Aylesworth as the first managing director of the association.

A past-president of the P.C.E.A., in its youthful 1916-1917 days, he has watched carefully its growth and helped it as he could. Among the many honors showered upon him was election to the Franklin Institute of Philadelphia; he was the first to receive the John B. Miller medal for distinguished service to his own company.

Civically, he was interested in all important cultural and scientific developments in southern California. A lover of music himself, he was a genuine sponsor of Los Angeles' Philharmonic organizations.

No fuller truth could have been spoken of Mr. Ballard than the words of Dr. R. B. von KleinSmid, president of the University of Southern California, when he conferred an honorary degree in June of this year. The educator characterized the utility chief as "a champion of all good causes in this and other communities and a stalwart citizen of rare services."

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Spokane Power District Plan Blocked

Opponents of the plan to form power districts in the city and county of Spokane, Wash., scored heavily when a court ruled that the petition for a county power district outside the city was "fatally defective" and restrained the election board from placing it on the November ballot.

The plan was based on the Grange power district statute. Petitions had been filed with the county commissioners, who held public hearings on the plan and excluded from the proposed district properties of those who objected; as a result, more than half the county was excluded. Opponents of the plan, including many large industrial concerns, contended that it was invalid and faulty, pointing out that it did not comply with the statute in several particulars. Decision to take the matter to court followed the refusal of the commissioners to dismiss the petition.

Following the court's decision, leaders of the Grange expressed fear that the plan for a power district within Spokane also would fail. They decided, however, to rush petitions in six voting precincts and form a small district by an elimination process. If this is successful, the district will be watched carefully.

As this issue of ELECTRICAL WEST went to press, word was received that opponents of the power district within Spokane had also been victorious, the court holding that the petitions were defective and enjoining the commissioners from considering them further. The decision means an end to the Spokane power proposal for this year, as no appeal was made.

Nevertheless, at least three districts will vote on power bills in November. Whatcom county will vote on the creation of what is to be known as Public Utility District No. 1 of the state of Washington; Yakima and Skagit counties have petitioned their commissions and measures will be voted upon. In all cases, under the statute, the district has authority to deal in power if the voters pass such measures, but the county commissioners are not compelled to enter the power business if they deem it inadvisable.

"Heatricity" Wins $100 Prize

Ben D. Moses, professor of agricultural engineering, University of California College of Agriculture, Davis, is the winner of the Pacific Coast Electrical Bureau-ELECTRICAL WEST name contest, the judges decided last month, and the winning suggestion is "Heatricity."

Funny, but lots of suggestions were close to that. Names like "Heatelec," "Tricheat" and "Heatric" poured in by the envelopes-full. But as long as the judges, who were members of the executive committee of the bureau, decided that "Heatricity" was the best, that's that.

It would be nice to have a hundred dollars, though. Wonder if any new contests are around loose. If you think of one, you might help the unemployment situation by keeping the Contest Editor at work.

First Oregon Utility District Created

Tillamook county, on Aug. 9, created the first public utility district in Oregon, under the 1931 state constitutional amendment and interpreting laws. The district now may proceed to establish and operate public utilities of all classes and also acquire, by condemnation or purchase, the properties of any or all private utilities in the district. Mountain States Power Co. now serves the county, and has a steam plant in the city of Tillamook.

California Grange Asks Condemnation Privilege

At a Sacramento, Calif., Grange meeting, presided over by State Master Sehlmeyer, a resolution was passed favoring a law making it possible for rural communities to condemn and take over the distribution systems of private utilities. The action was taken following the asserted refusal of the state railroad commission to force reduced electric rates for farmers, and presages a battle in the next legislature for a change in the present law.

▼

Colorado Commission Sets Precedent

Colorado's public utilities commission last month made a far-reaching decision on the question of public utility rates, in an order compelling Western Colorado Power Co. to reduce its wholesale rate for electricity furnished Gunnison Valley Power Co. The ruling holds that, while the income account of the Western Colorado company shows a loss for the last year, there must be a fair relationship between rates to different classes of consumers.

"Certain rates of a utility may be too

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On World Tour

When the S.S. President Pierce sailed on its world tour, leaving from San Francisco the last part of July, it took the 2,250,000th Frigidaire along to preserve perishable fruits and other delicacies from distant lands, so that they can be placed on exhibit at the 1933 Chicago World Fair. Talking to Chief Steward W. C. Hines are O. R. Doerr, (center) Pacific Gas and Electric Co. refrigeration specialist, and T. G. Supplee, of the San Francisco offices of Frigidaire Corp.

high," it sets forth, "even though the income on all rates does not meet the total charges."

Western Colorado Power Co., subsidiary of Electric Bond & Share, contended that the cost of supplying wholesale power from its steam plant, which produces energy used by the Gunnison company, was such that a reduction could not be made economically, but the commission decided that the rate cannot be based on the cost of producing energy at a single plant, but costs on the whole system must be taken into consideration. The defendant company also operates a number of hydro plants, which produce energy at the switchboard for about 1.5 mills per kw.-hr.

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Reduction Ordered in Oregon Rate Case

Rate reductions in the Northwestern Electric Co. schedules were demanded by Charles M. Thomas, public utilities commissioner, in an order handed down on Aug. 27. The reductions, effective Oct. 1, include 16 per cent for residential, 9 per cent for commercial service and 2 per cent for commercial power; this means, the commissioner pointed out, an overall reduction in gross revenue of 10 per cent. The decision, to be supplemented later, ends an investigation of more than a year. (See EWEST, May 1, et. seq.)

Six pages of the order were devoted to a discussion of jointly-used (operating) property located in Oregon and Washington, one of the outstanding questions involved. Jointly-used property in developing the pooled power was apportioned on the basis of 50 per cent to Oregon, 50 per cent to Washington. Valuation of the company's property, including steam heat, was fixed at $12,666,669.

Thomas indicated that he would issue a supplementary order in which he will discuss the contract between Northwestern and Electric Bond and Share Co. This also was a high point in the recent investigation.

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Central Public Service Reorganizes

Central Public Service Corp., $375,000,000 holding company, is going through voluntary reorganization, under a plan which contemplates the formation of two new companies, Central Public Utility Corp. and Consolidated Electric & Gas Co., to acquire certain assets of the existing system. In this manner, Central Public Utility will be the major holding company, owning both Central Public Service and Consolidated Electric & Gas. Central Public Utility Corp. will control the Pacific Northwest Public Service Co., which is the holding company for the Pacific Coast properties, namely, Portland General Electric Co., Seattle Gas Co., and Portland Traction Co.

A statement from Chicago, discussing the reorganization, says: "It follows the English system of anticipating financial difficulties and voluntarily correcting the governing conditions, rather than awaiting the full development of the problem and allowing responsibility for its solution to fall upon security holders and outside interests, which usually proves costly."

Stockholders' Suits Not Given Precedence

Fifteen suits, brought by stockholders against Central Public Service Corp. and Pacific Northwest Public Service Corp., will not be advanced on the trial docket to Oct. 1, pending the reorganization plans, it was ruled by the presiding judge of the Oregon Circuit Court.

Suits had been filed in Portland against the two companies, alleging misrepresentation and illegal conversion of securities.

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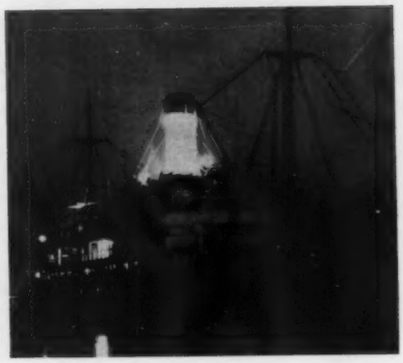
Power Commission Holding Company Report in Press

Pacific Gas and Electric Co. stands first in the country in installed capacity of licensed plants, with nearly 450,000 kw., or 38 per cent of its total capacity, leased from the Federal Government, the holding company report of the Federal Power Commission, now in press, will show. Following the Pacific Coast utility are Niagara Hudson Power Corp., Electric Bond & Share, and Commonwealth and Southern Corp., all national holding companies.

Included in the report will be summaries of each of the holding company systems, showing the chain of control from licensee operating company to the top company. Attention has been given to details of financial structure. Such statistics have been submitted to the various holding companies for verification before publication, so the report is authoritative in detail.

Still another section contains statistical analyses of 43 operating companies holding 48 major project licenses; the 43 companies are subject to control in more or less complicated systems leading up to ten top companies. Tables in the report show the sales of power by several of the licensees to large customers, with prices varying from 3 mills to more than 2 c. in different parts of the country. Other tables serve as exhibits of the trend in character of sales, a general tendency being shown for sales for commercial and domestic uses to increase progressively, along with a falling off in industrial sales.

Light Ahoy!



Santa Cecelia, Grace Line steamer, whose well-lighted stack is shown here, is one of four of this company's ships equipped with four 300-watt, pedestal mounted, Wuelker floodlights to illuminate the stack at night, especially when passing ships at sea. The Panama Mail Line has likewise equipped its ships recently. The installation was made by the Marine Electric Co., San Francisco, and consists of four units, placed 6 ft. back from the stack on four sides of it, controlled by a switch in the pilot house. The lighted stack is visible many miles out at sea

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Injunction Halts Work on L.A. Power Bureau Wilmington Steam Plant

RESTRAINING the Los Angeles Bureau of Power & Light from proceeding with the construction of the Wilmington steam plant (EWEST, July 1, et seq.), a temporary injunction was secured from the superior court by Southern California Edison Co. Ltd., J. B. Van Nuys, David T. Babcock and others, on behalf of themselves and all other taxpayers. The complaint, filed Aug. 17, alleges a waste of $7 millions of city funds is threatened in the proposed construction. Various grounds are offered in support of the charge.

Hearing on the application for a permanent injunction was held on Aug. 29.

Commissioners Under Fire By Mayor Porter

Los Angeles' city council for the second time in four months rejected Mayor Porter's proposal to oust Water and Power Commissioners John R. Haynes, John W. Baumgartner and A. F. Southwick, charged by the mayor with wastage of public funds. Following this, a council member proposed a charter amendment, to be placed on the November ballot, dividing the water and power department in two, with two distinct commissions. The proposal was referred to committee.

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CORRECTION—In the item on p. 79 of the August issue, anent the contract for power for the building of Metropolitan Water District's Colorado River aqueduct, the rates should be: A fixed monthly payment of $1,500, plus 95 c. per month per kilowatt of maximum demand, plus 5 mills per kw.-hr., with a minimum monthly charge of $3,000, this minimum to include the fixed charge. In the item mentioned, the 95 c. per kw. clause was omitted.

G.E. Engineers Progress on New Light Source

Development of the sodium vapor lamp, a new source of light with a brilliant yellow glow, rapidly is progressing, it is reported by lighting engineers of General Electric Co., who have been working on the problem. One of the engineers has constructed a practical, 100-watt, d.c. lamp giving an overall efficiency of 34 lumens per watt; this can be increased by known means to 50 lumens per watt, it was indicated. The ordinary Mazda of 100 watts operates at only 14 lumens and the largest and most efficient incandescent lamp has an efficiency of only 22 lumens.

Where monochromatic radiation is required, in spectacular lighting, and in the wide field where cheap light is demanded, the sodium vapor lamp has been found to be a desirable light source. It is not appropriate, however, for general lighting in houses and stores where color values are essential.

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Sacramento Utility District Asks R.F.C. Loan

To finance the Silver Creek water and power project, the Sacramento (Calif.) Municipal Utility District has asked the Reconstruction Finance Corp. for a loan of $12,600,000 at the lowest possible rate of interest on an amortization basis not to exceed 50 years. The project has been before the voters and has been defeated three times.

Simultaneously with these negotiations, the district directors are going ahead with plans with Pacific Gas and Electric Co., whereby the utility will take over the power rights of the project.

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Utility Earnings Holding Up Well

Reports from several Western power companies of their earnings, over irregular periods, show that earnings are holding up well, usually are above last years'.

Pacific Gas and Electric Co.—For six months ended June 30, net operating income was $24,657,909, a drop of $281,-233 over the same period last year. Gross revenue decreased $155,645.

Sierra Power Co.—For year ended July 31, balance after interest and taxes was $431,867, compared with $361,955 for preceding year.

California Oregon Power Co. — For year ended July 31, net profit of $642,642, compared with $575,049 for preceding year.

Coast Counties Gas & Electric Co.—For year ended June 30, net profit of $454,286, as against $378,713 for preceding year.

Seattle City Light—For six months ended June 30, net profit of $392,186, compared with $381,793 for same period last year.

Pacific Lighting Corp. — For year ended June 30, net profit of $7,766,-612.68, compared with $7,218,910.79 for preceding year.

Southern Colorado Power Co. — For year ended June 30, net profit of $494,539, compared with $597,569 for preceding year.

Nevada-California Electric Corp. — For year ended July 31, net profit of $2,724,724, compared with $2,310,035 for preceding year.

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Nation's Largest Precision Testing Machine Installed in U.C. Laboratory

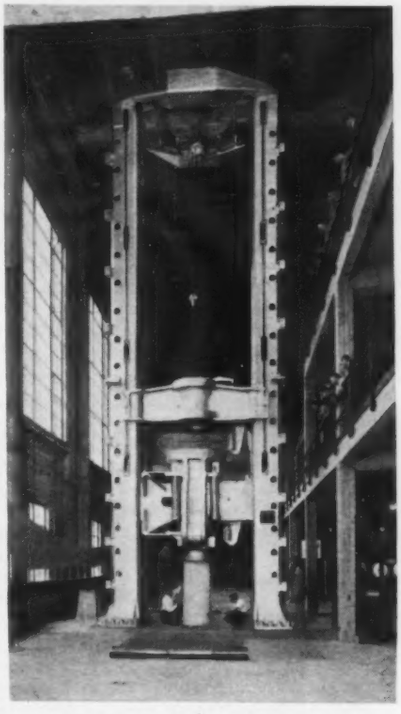
BUILT and tested in the shops of Baldwin-Southwark Corp., at Eddystone, Pa., the country's largest universal testing machine now is in operation in the engineering materials laboratory at the University of California, Berkeley.

Hydraulically-operated, it is capable of testing full-size tension and compression members up to a length of 33 ft. 6 in. and under loads up to 4,000,000 lb. in compression and 3,000,000 lb. in tension. The lateral dimension maximum is 10 ft., although the length of the flexural members which may be tested in unlimited.

The principal unit of the weighing system is the Emery support, or hydraulic capsule, a heavy inelastic cylinder with a loose-fitting piston, the end of which is covered by a diaphragm. The movement of this piston is only a few thousandths of an inch at the most, and the oil with which the capsule is filled, when displaced by this motion, causes a change of shape in the elastic tubes to which the capsule is connected. These elastic tubes control four indicators on an adjoining instrument board.

One of the unusual features of the machine is the inclusion of devices for maintaining a constant load over an indefinite period; for application of a load at constant rates of load increment; and start, stop and inching buttons.

When completely assembled at the university, it will be equipped with an elevator for operators to examine any part of the test specimen, with telephone connections from a glass-inclosed instrument and control booth, and with loud speakers to keep operators or observers informed of the progress.



News Shorts

¶ EL PASO Electric Co. won the 1932 trophy offered by National Safety Council, completing 616,842 man-hours without a single lost-time accident.

¶ SOUTHERN California Edison Co. will sell certain of its distribution facilities to Pasadena for $2,894, the sections where the facilities were located having been annexed to the city.

¶ OF ITS $12,000 total income, taxes took $3,000, Grimes Pass (Idaho) Power Co. plead in its appeal for reduced valuation. Moreover, trouble came along in 1931 in the shape of forest fires which burned out several of the best customers.

¶ NEW MEXICO'S Corporation Commission has asked New Mexico Electric Co. for an explanation of a 25 c. per kw.-hr. rate, charged by petitioners at Hobbs, N. M.

¶ CITY ELECTRICIANS laid off by Seattle City Light will receive full-time pay and all other city employees working part time will receive full pay if their total paychecks do not exceed $110 monthly, Mayor John Dore announced.

¶ ASSESSMENT VALUE of properties of Montana Power Co. was increased $7 millions after a hearing before the state board of equalization, making a valuation of $66,521,659.

¶ DIXIE POWER CO., with headquarters at Cedar City, Utah, is now Southern Utah Power Co., although the change in name does not alter ownership or management.

¶ GRAYBAR ELECTRIC CO. and Western Electric Co. must pay $15,000 for injuries to a housewife when her arm caught in a washing machine wringer, a Tacoma jury decided. The plaintiff claimed a safety device failed to work.

¶ WESTINGHOUSE Electric & Mfg. Co. received an order for a 12,500-kva. high-pressure steam turbo-generator from Hawaiian Electric Co., Ltd., the order amounting to more than $275,000.

Meetings

Two Lighting Schools Planned for October

Tentative plans have been made for two outstanding lighting schools during October, one in Los Angeles, another in San Francisco, under the auspices of the P.C.E.A. Lighting Bureau of the Commercial Section, according to announcement just made by R. A. Crosby, Los Angeles Gas & Electric Corp., vice chairman of the bureau. Mr. Crosby, at the Chicago meeting of the National Commercial Section, last March, made arrangements which are to be culminated in two schools, each of a week duration, in the cities named.

Tentatively, the dates set are: Week of Oct. 17 in San Francisco; week of Oct. 24 in Los Angeles. While details of the program are yet in formation, it is expected that two international authorities on lighting will be present as lecturers. These are S. G. Hibben, Westinghouse Lamp Co., Bloomfield, N. J., and A. L. Powell, Nela Park engineering department, Cleveland, Ohio. Mr. Powell will just be returning from a vacation spent in Europe, from which undoubtedly he will again bring back a number of novel ideas in illumination practice developed on the continent.

Full details and program will be announced in these columns in the next issue.

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Colorado League Stages Picnic

The electrical industry of Colorado practically closed shop on July 28, when 1,600 members of the Electrical League of Colorado and their families gathered in Denver for the league's annual picnic. Tribute to the manner in which it was publicized and staged, this year's affair was one of the best attended in history.

Nearly 100 prizes were distributed, ranging from a Thor ironer, donated by B. K. Sweeney Electrical Co. and won by Luke J. Storey, general superintendent, Home Gas & Electric Co., Greeley, to a half-dozen trout flies, won and filed for future reference by John Malpiede, Denver's city electrician.

Public Service Co. of Colorado's ball team, victors from 1920 to 1931, suffered their second straight annual loss at the hands of the Allied Electric Industries team, captained by Ross H. Adams.

Trade Terms Given Events at Utah Picnic

Members of the electrical industry of Salt Lake City and adjacent territory gathered at the Lagoon summer resort, about 16 mi. from Salt Lake City, for their annual outing on August 17. The event was sponsored, as in the past, by the Electrical League of Utah.

A large and enthusiastic crowd was in attendance, and the program consisted of athletic events titled in a novel manner by the use of electrical terms, for which a large list of prizes were contributed by various members of the industry; a picnic luncheon, entertainment, water sports and dancing were included.

Under General Chairman Leo Brandenberger, the various committees were headed by R. P. Maybee, Ross Ramsay, W. M. Moreton, W. B. Roberts, M. L. Cummings, Jr., J. A. Kahn and W. W. Crocheron.

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S. F. League in Night Golf Tourney

Since the electrical industry was responsible for bringing golf out at night, it was only natural and appropriate that the first tournament on the newly-lighted Ingleside Golf Course at San Francisco should be held by the San Francisco Electrical Development League. Accordingly, on July 15, 45 members of that organization turned out to play nine holes of golf on a full-size, regulation golf course, the first illuminated in the West.

Arrangements had been made by a committee headed by Harry M. Thomas, Chamblin-Thomas Company, and consisting of William L'Hommedieu, Willis Winter, Westinghouse Electric & Manufacturing Co., Don Ray and Harry Carroll, Pacific Gas and Electric Co.

Even President Al Joy, an inveterate non-golfer, played. He put up a grueling struggle to defeat W. A. Cyr for the highest score and lost by two strokes.

Low gross was made by Ralph DuVal, Pacific Gas and Electric Co., for which he was awarded the San Francisco Electrical Development League perpetual trophy. He also made low net, class A, but could not claim the trophy for this event. Accordingly, the low net cup went to the second low net, class A winner, Roy Kimberlain, Graybar Electric Co. He was awarded the A. E. Rowe & Co. trophy.

Nighthawks Bill L'Hommedieu, left, and Harry Thomas, right, even had golf's last victim, President Al C. Joy, of the San Francisco Electrical Development League, convinced of the virtues of night golf. Al Joy fought vainly to shatter the Ingleside Course high gross record

Both of these trophies are to be played for again until won three times by any one player.

In the Class B event the low net went to Bill Euler, Pacific Gas and Electric Co., and second low net to J. C. Lanahan, Safety Switchboard Manufacturing Co.

Winner of the blind bogey was Emmett Hicks, of Wired Heat Shop.

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A.I.E.E. Convention Reports in October

Because the Vancouver convention of the Pacific Coast sections of the A.I.E.E. was held too late in the month for reporting in this issue, a full account of the meeting will be published in the next issue.

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C. E. BATES, assistant to chief bookkeeper, Los Angeles Gas and Electric Corp., was chosen president of the corporation's employee's association at its annual election in June. Mr. Bates has been vice-president of the group for the past year. W. J. Fraser was named vice-president and Arthur Maltitz was re-elected to serve his fourth term as treasurer. Installation of these officers and ten directors took place at a dinner and party at the Los Angeles Breakfast Club on July 12.

Z. E. MERRILL, vice-president in charge of operations, Mountain States Power Co., has been elected president of the Albany, Ore., chamber of commerce. Mr. Merrill also is commander of the Albany American Legion post.

Coming Events

Illuminating Engineering Society—Twenty-sixth annual convention at New Ocean House, Swampscott, Mass., week of Sept. 26, 1932.

International Association of Electrical Inspectors, Northwest Section—Seventh annual convention at Wenatchee, Wash., Sept. 6-8, 1932 (tentative).

Southwest Section — Convention at Santa Barbara, Calif., Sept. 12-14, 1932.

National Electrical Wholesalers Association—Annual convention, Hotel Statler, Buffalo, N. Y., Sept. 26-30, 1932.

Association of Electragists International—Annual convention, Kansas City, Mo., Oct. 10-12, 1932.

National Electric Light Association—

Rocky Mountain Division — Annual convention, Stanley Hotel, Estes Park, Colo., Sept. 12-14, 1932.

Pacific Coast Electric Association—Engineering Section meeting, San Francisco, Oct. 19-21, 1932.

Personals

P. M. Downing Heads New National Sales Section

MUCH interest has centered around the appointment of P. M. Downing, vice-president and general manager of Pacific Gas and Electric Co., to the chairmanship of the N.E.L.A. National Sales Section, outgrowth of the former Commercial Section, because fundamentally he is an engineer. But the compliment paid Mr. Downing, brought up in the ranks of engineering from lineman to manager, is a deserved palm to an executive who has kept his sales force intact in 1932 and who has relaxed effort neither in advertising nor sales program.

Justification for his appointment as leader of the industry's sales and commercial forces is not hard to find in the records of his past few years' activities. One of his first jobs, in fact, after

P. M. DOWNING

graduating from Stanford University in its first class, 1894, included the joint responsibility of line foreman, boiler tender (on occasion), gas maker, collector and manager of the Colusa, Calif., gas and electric works. He tells of a busy evening there when, in the full dress regalia of manager, he attended a chamber of commerce banquet, only to be drawn from the festive board by low pressure in the gas mains. Rushing to the plant, he stoked the gas generators, washed, went back to the banquet. Later that night he climbed poles to repair line trouble.

In so diversified a position, Mr. Downing could not but acquire the solid rudiments of the commercial side of utility management.

Early in 1928, upon being made president of the P.C.E.A., he upset the engineering tradition by talking of commercial problems to the Engineering as well as to the Commercial Section at the first conclaves of the year. He urged the commercial men to bring their close field experience to the aid of management in the shaping of good commercial rate structures.

Throughout his administration as P.C.E.A. president, Mr. Downing stressed the need for increasing the load density on existing facilities, a wholly commercial problem. The convention in 1929, his administration's closing gesture, was predominantly commercial in character.

At the N.E.L.A. convention in June of this year, he gave the industry a glimpse of itself by his translation of milk rates into electrical terms.

More recently, the personal interest he took in the electric range and water heater campaign of his company (EWEST, Aug. 1, p. 80), and his last hour marshalling of all division managers to carry the quota over the top, gave impetus to the company's difficult sales job this year; his personal leadership probably has placed his company in a better position to maintain its load than any other Pacific Coast utility.

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C. F. DALZIEL, of the electric meter department, San Diego Consolidated Gas & Electric Co., recently was appointed as an associate in electrical engineering at the University of California. Mr. Dalziel, who has become a recognized authority on metering, has written many articles on the subject for ELECTRICAL WEST. His place as relay and instrument inspector for the San Diego company is being taken by Joseph Sinnott.

A. R. FRYKLUND, former sales specialist in the San Francisco office of Graybar Electric Co., has been appointed assistant sales manager for that office, it was announced by A. H. Nicoll, San Francisco district manager for the company.

WALTER J. WALSH, attorney of San Francisco, formerly a sales engineer for Great Western Power Co. and now vice-president of Wuelker Reflector Lighting Corp., has just received appointment from Governor Rolph as manager of the Sacramento office of the California Division of Immigration and Housing. Mr. Walsh was admitted to the bar while with the Great Western Power Co., with which he had been connected for many years. He also worked for the Montana Power Co., at Butte, shortly after his course at the General Electric Co., at Schenectady, had been completed.

Royer Heads Northwest Association

J. E. E. ROYER, vice-president and general manager, Washington Water Power Co., was elected president of the Northwest Electric Light & Power Assn. at the meeting of that organization's executive committee on July 30. Vice-president last year, he succeeds

J. E. E. ROYER

P. M. Parry, vice-president and commercial manager, Utah Power & Light Co. L. T. Merwin, vice-president and general manager of the Northwestern Electric Co., was named vice-president.

In addition, the following state vice-presidents were elected:

Idaho—R. B. King, Idaho Power Co.

Montana—J. C. Ryan, Montana Power Co.

Oregon — C. M. Brewer, California Oregon Power Co.

Washington — L. R. Coffin, Puget Sound Power & Light Co.

Utah — George M. Gadsby, Utah Power & Light Co.

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J. W. McARTHUR, close associate of Carl McClain (see Obituary) and since 1914 connected with the Eugene Water Board, has been chosen to succeed Mr. McClain as superintendent of the Eugene, Ore., water and power plants. Mr. McArthur graduated from Oregon with his predecessor and took a degree at Cornell with him.

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Obituary

CARL A. McCLAIN, since 1918 superintendent of the Eugene, Ore., municipal water and power plants, died suddenly at his home in that city Aug. 5. He was well known as one of the outstanding municipal utility officials on the Pacific Coast. A native of Iowa, where he was born in 1878, he went to Eugene to enter the University of Oregon, graduating in civil engineering in 1906. He later attended Cornell for two years and was called to take charge of the Eugene system from Cleveland, Ohio, where he was employed by the water department. He was a member of the A.S.C.E., A.A.E., American Water Works Assn., and various fraternal organizations.

PAUL BUTTE, president of the Butte Electrical & Mfg. Co., San Francisco, died suddenly of heart attack, on Aug. 21, at his home. Mr. Butte was prominent in fraternal circles and civic affairs, having worked out many of the plans for the electrical equipment on the proposed Golden Gate Bridge. His business since dissolution of partnership with his brother, Felix Butte, several years ago, has been specialized to signal, burglar alarm, fire alarms and switchboard systems. He was considered one of the best authorities on these subjects in the bay region. Mr. Butte was 53 years of age, was born in Oakland, attended San Francisco high schools and Stanford University.

Contractor Dealer Inspector

Southern Inspectors Economize Convention

Frank A. Short, president, Southwestern Section, International Association of Electrical Inspectors, has just announced the plans and program for the forthcoming convention of the section at Santa Barbara, Sept. 12 to 14, in such terms that it should prove the season's most popular convention. Every effort has been made by the committee in charge of arrangements, headed by Harry V. Dobson, city electrical inspector of Santa Barbara, to make the con-

FRANK SHORT

vention as economical as possible. Even the major program features have been crowded into the first day's session so that those who can attend only for one day may derive a great deal of benefit from that single day's session.

Registration fee has been eliminated; special rates of from $2 to $2.50 per person, garage free, have been made with the Carrillo Hotel; the dinner dance on Monday evening will cost but $1, and in every other way the cost to the delegates, many of whom this year must come at their own expense, will be held to a minimum.

Monday sessions begin with the usual welcome and business transactions, and include an address by International President F. D. Weber, of Portland, and a talk, "One Code," by Victor H. Tousley, international secretary, as well as reports of code article committees.

Tuesday morning's session, held at the California Theater, will feature talking movies, "From Mine to Consumer," a film depicting the making of copper wire, and a film showing the electrical equipment on a modern liner. R. H. Manahan, past international president, will conduct his usual and worthwhile discussion of inspectors problems, an open forum.

At Tuesday afternoon's session, W. A. Cyr will present the National Electric Light Assn. paper, "Adequacy in Wiring," setting forth that association's interest and viewpoint as respects wiring and adequacy. The remainder of the day will be devoted to the discussions of inspector's interpretations of code rules which make these conventions so valuable to inspectors.

On Wednesday morning, for those who can remain, special committee meetings and study subjects will be arranged. In the afternoon the entertainment committee will provide golf, amusements, tours of Santa Barbara and other items of interest.

Convention committees announced by President Short consist of: Mr. Dobson, general convention chairman; reception, Frank Short, Claude W. Mitchell and R. H. Manahan; program, Theodore C. Combs; transportation, H. C. Rice and J. M. Evans; and entertainment, Frank Short, W. A. Cyr, and R. Smith.

Northern Inspectors to Consider Code Changes

Suggested amendments to the various Articles of the National Electric Code to be presented to the Electrical Committee as the recommendation from the Northwestern Section, I.A.E.I., will be the principal matter of business to be taken up at the Seventh Annual Convention of this organization at Wenatchee, Wash., Sept. 6-8, 1932. Also, there will be reports of seven special committees to be discussed, according to an announcement by F. D. Weber, Portland, Ore., secretary-treasurer of the association. The meeting will be presided over by President John A. Casey, electrical inspector of Walla Walla, Wash.

Other items of interest on the program being arranged by the meetings and papers committee, E. B. Morrison, Portland, chairman, include papers on grounding by J. B. Downer, City Water Works Department, Seattle, and L. Lauridsen, Portland General Electric Co.,

F. D. WEBER

Portland; "How to Sell Fire Prevention to the Public" by J. C. Stevens, National Board of Fire Underwriters, San Francisco; and "Residence Wiring Standards" by an authority yet to be named.

In the meantime a committee from the Wenatchee Electric Club, consisting of Dan Regan, Wright Electric Co.; Frank Smallidge, Electric Supply Co.; Bob Pounder, Pounder Electric Co.; Henry Kruse, Puget Sound Power & Light Co.; and J. F. Julian, electrical inspector, is planning suitable entertainment and interesting trips. The Wenatchee orchards and apple packing plants, and the Rock Island hydro-electric plant on the Columbia River will be points of interest made available to delegates. The annual golf tournament will be a feature of the diversion offered; special entertainment is being arranged for the ladies.

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Sievers Delegate to Electragist Convention

Frank Sievers, of Kuchel-Sievers Electric Co., San Francisco, and executive committeeman from the Pacific Coast for the Association of Electragists, International, plans to leave for the annual convention of that association at Kansas City, Mo., to be held Oct. 10 to 12. A committee of California Electragists is preparing a paper for presentation by Mr. Sievers at the convention. It is being planned that upon his return from the convention the California Electragists will hold a fall convention to hear Mr. Sievers' report and likewise to transact any other pending business of the organization.

With the resignation of the H. S. Tittle Co., Tom Harris, member from that firm and president of the California chapter, is being succeeded by Vice-president Lloyd Flatland, Globe Electric Works, San Francisco, and president of the San Francisco Electragists, according to Edward Martin, secretary.

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"CALIFORNIAN" is the name of a new electrical refrigerator being manufactured at Marysville, Calif., by Roberts & Francis. Jack Francis is sales and business manager while Mr. Roberts is production manager for the company. Mr. Francis formerly was sales manager for the Ellis-Marks Music Co. in Marysville and Mr. Roberts has been connected with the Nash automobile agency in that city. The box is a 7½-cu. ft. size, is porcelain lined with lacquered exterior, uses sulphur dioxide refrigerant, 2½ in. of Celotex or Firtex insulation, is equipped with Wagner motor and assembled mechanism and retails at $189. Distribution is limited to the area adjacent to Marysville and Chico.

GRIDER Electrical Co., 409 East Weber Ave., Stockton, Calif., has been appointed northern California and Oregon distributor of the Airex ventilating fan, manufactured by Mountain States Equipment Co., of Denver, Colo. The popular 27-in. fan is equipped with a 1/6-hp., 110 volt Emerson motor, and delivers 7,500 ft. of air per minute. This unusually large delivery of air is claimed because of the particular design of the fan blades. Mr. Grider personally is supervising the distribution of this product.

A. P. MAY Co. and the Bruce Radio Shop, of Coalinga, Calif., were the first of the electrical dealers to accept the invitation to display their appliances in the newly lighted windows of the San Joaquin Light & Power Corp. there. A total of 1,200 watts of window lighting was installed.

Denver Contractors Consider New Agreement

Notification was given the electrical workers union at Denver, Colo., by a committee from the Denver Electrical Contractors' Association, that after Oct. 15, 1932, the existing agreement would cease to exist. Notice of this action was given the Industrial Commission of Colorado.

It was planned by the committee to endeavor to make some new adjustment before the Industrial Commission takes jurisdiction, and, during September, to notify both the union and the commission of the scale of wages the contractors will pay at the termination of the existing contract.

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W. R. GRASLE, for many years engineer and chief estimator for E. L. Knight & Co., electrical contractors of Portland, Ore., has severed his connection with that firm and opened his own electrical contracting business under the name of W. R. Grasle Co., 501 Lumbermens Bldg., Portland. No appliances are handled by the company.

FEELING THAT most of the misunderstanding about range wiring costs is due to lack of appreciation of the actual items which go into an installation, Jack Kohl, manager of the Sterling Electric Co., Sacramento, has made it a practice to prepare a complete cost sheet on each range-wiring installation he makes for the power company or for merchandise distributors. These detail sheets are turned over to them so that a better appreciation of these costs can be built up. Even the type of material, whether of first or second grade, is specified, so that comparisons can be made. Mr. Kohl thinks that if more contractors followed the same plan, their position would be very much improved.

G. E. MacDONALD, sales manager of Jameson's Electrical, Ltd., Victoria, B. C., authorized General Electric home appliance dealer, announces the opening of a branch store at Duncan, B. C., on Craig St., next to Duncan Utilities, Ltd. A full line, consisting of washers, radios, refrigerators and numerous other appliances, will be carried in stock at all times.

W. E. ASHLEY recently opened a new electric shop at 288 North Eighth St., Colton, Calif. He had previously operated stores in San Bernardino and Santa Ana.

W. K. KEHR, proprietor of the Federal Electric Co. at Vallejo, Calif., recently appointed Stanley Pierce, well known electrical construction man and estimator in the San Francisco Bay area, as superintendent of the wiring department of his company. Mr. Kehr is an aviation enthusiast and himself a licensed pilot. Last year he flew with L. Lenish in the Men's National Air Race. He owns his own plane, finding it very handy for hunting and fishing expeditions.

A. R. HANCOCK, pioneer electrical dealer and contractor at Oroville, Calif., has recently been appointed authorized G.E. appliance dealer in that territory. He has enlarged his store to double its former merchandising display space, giving him an additional window and more floor area for display. The fixture room formerly located at the rear at one side of the shop has now been opened out into a display room. A complete merchandising display is carried. During the recent mining convention and '49 celebration, a feature display of old mining relics in the window attracted attention to the merchandise of modern times.

THACKERAY ELECTRIC Co. at Red Bluff, Calif., is installing electrical work in the new Masonic Temple being built in that city.

SAN BERNARDINO ELECTRIC SERVICE & MAINTENANCE Co. is a newly opened shop at 376 D St., San Bernardino. E. L. (Mac) McAdams, formerly with the Page Electric Co. for several years, and later operating a store of his own on E St., is proprietor. The new store is at a downtown location.

MILLER'S ELECTRIC SHOP, located in Marysville, Calif., on the highway to Yuba City, Calif., recently celebrated its first birthday in its new location in the semi-residential district. The shop and merchandise display are located at the front, near the sidewalk, with the Miller home at the rear. This arrangement allows Mrs. Miller to take care of the store while Mr. Miller is engaged on construction work.

C. W. BURCHETT, owner of the Theater Lighting & Equipment Co., San Francisco, recently moved up the street to 283 Golden Gate Ave. Mr. Burchett is known as a theatrical equipment authority throughout the West.

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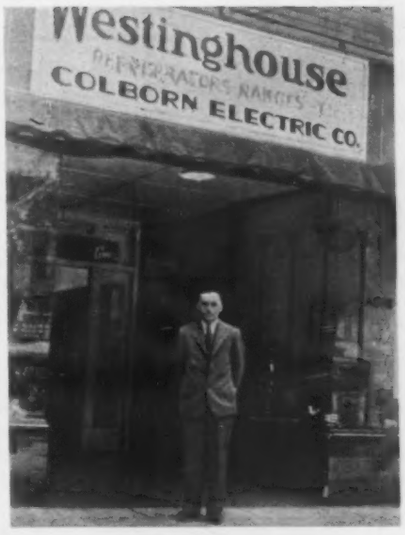
Opens San Francisco Quantity Survey Bureau

Tom J. Bennett, well known in northern California as a former electrical contractor and estimator, has announced the starting of a quantity survey bureau for supplying any electrical contractor in that region with detailed and carefully computed lists of materials on any electrical construction project. Mr. Bennett plans only to work out material estimates, the contractor obtaining such lists doing his own pricing and labor estimating. Other services of a like nature are also contemplated for any contractor requiring engineering assistance on a project.

Mr. Bennett until recently was associated with the Triangle Conduit Co., as salesman, and previous to that connection was estimator for some large electrical construction firms in San Francisco. Some years ago he was in business as a contractor himself and has been an officer of contractor associations on several occasions. He has located his office at 604 Mission St., San Francisco, in room 604.

Merchandiser



J. H. Siegrist has been placed in charge of the new merchandising department of the Colborn Electric Co. at Upland, Calif., a firm which, after twelve years of wiring, decided upon this new department. The merchandising store is at 120 North Euclid Ave., Ontario, Calif.

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Seattle Seeks Boost In Permit Fees

Seattle's city council has under consideration the recommendation of its finance committee that fees be charged for building, electrical and plumbing inspection in Seattle as a step toward reducing the general tax levy by making the building department partially self-supporting.

Fifty per cent of the fees on any one structure must be paid, under terms of the ordinance, before plans are inspected by the department, and this amount will be forfeited if no permit for the structure is issued. On the average residence, costing about $6,000, the total fees would amount to about $15.

Electrical permit fees will be charged according to outlets, units of equipment connected and type of work. For instance, 75c. will be charged each lighting circuit up to five, after which each will be charged 50c.

Fees will also be charged on marques, ornamental and sign lighting and motor installations.

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GEORGE JOHNSON, formerly in business at Yuba City, Calif., first as an electrical contractor and dealer and then as a hardware dealer, recently moved to Beaver on the new Great Northern Railway cutoff where he has established an electrical contracting business.

NE PAGE-McKENNY Co., Seattle contractors, recently were the successful bidders for electrical work in the new $370,000 Law School for the University of Washington, Seattle.

Manufacturer Distributor

Northwest Wholesalers Organize

Following a number of informal industry meetings which have been held by wholesalers in the Northwest during the past few years, a permanent form of organization now has been adopted, with The Puget Sound Electrical Wholesalers Assn. as the name. Anyone engaged in the manufacture or distribution of electrical merchandise at wholesale is eligible to membership; the list now includes, manufacturers, local offices of Eastern manufacturers, manufacturers' agents and jobbers.

Harry Byrne, Sr., of North Coast Electric Co., is chairman of the executive committee and active head of the organization. R. F. Robinson is secretary-treasurer. Offices are maintained at 617 Fourth Ave., Seattle.

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Westinghouse Takes Over Elevator Company

W. R. Marshall, commercial vice-president of Westinghouse Electric & Mfg. Co., announced during the month that his company would take over the complete activities of the Spencer Elevator Co., of San Francisco.

No change in the operation of the company will be made, A. F. Skaife, who has been with the elevator concern for 20 years, becoming general manager of the new company.

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Arrow-Hart & Hegeman Ordered to Dissolve

Arrow-Hart & Hegeman Electric Co., Hartford, Conn., has been ordered by the Federal Trade Commission to divest itself of all common stock of the Hart & Hegeman Mfg. Co., or of the Arrow Electric Co., under a decision based on section 7 of the Clayton Act, which prohibits acquisition by a corporation of capital stock of a competing corporation.

The two companies merged on Dec. 31, 1928, and the commission held that the effect of this combination is (1) to substantially lessen competition between the two companies in the sale and distribution of electrical wiring devices; (2) to restrain interstate commerce in such merchandise in the regions where the two companies operate; and (3) to tend to create a monopoly in the electrical wiring devices industry.

Ninety days has been allowed for the completion of the commission's order.

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PACIFIC COAST representation of the Electrical Division of Colt's Patent Fire Arms Mfg. Co., Hartford, Conn., was taken over on August 1, 1932, by H. B. Squires Co., San Francisco, according to an announcement by S. P. Russell, president of the latter organization. Complete stocks will be maintained in San Francisco, Los Angeles and Seattle. J. H. Daveler, since 1922 Pacific Coast manager for Colt's, has joined the Squires' organization. The Noark line, which the organization now will represent, was one of the lines carried by Mr. Russell when he entered the agency business in California 30 years ago.

A. M. CASTLE & Co. has been appointed distributor of The Babcock & Wilcox Tube Co.'s products in the Chicago and Pacific Coast territories. The Castle company will be the exclusive distributor and sales agent for B & W tubes on the Pacific Coast, where it maintains warehouses at San Francisco, Los Angeles and Seattle, with the exception that C. C. Moore & Co., agents for Babcock & Wilcox, will continue to sell and service retubing jobs for B & W and Stirling boilers.

NATIONAL Enameling & Stamping Co., Milwaukee, and The Swartzbaugh Mfg. Co., Toledo, Ohio, joint pioneers in the development of electric cookers and electric casseroles, have merged their patent interests.

R. G. Harris Joins Maydwell & Hartzell

RICHARD G. HARRIS, former Pacific Coast manager of Standard Underground Cable Co., has returned to the Pacific Coast after three years in Denver and has joined the Maydwell & Hartzell organization, manufacturers' agents of San Francisco and Los Angeles.

Well known in the West, Mr. Harris joined Standard Underground immediately after his graduation from Cornell, later becoming Eastern Canadian manager, at Montreal. From 1920 until the merger of his company with General Cable Corp. in 1929, he was Pacific Coast manager of the Standard Underground company.

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GENERAL ELECTRIC'S Hotpoint heating device service station in San Francisco has been moved to 361 Bryant St. and will be operated under Merle C. Ross, formerly service manager at the stations in Seattle and Portland. These stations primarily repair merchandise found defective within the guarantee period. All appliances which do not come under this classification are recommended for dealer service and repair.

SYRACUSE Washing Machine Corp., manufacturers of Easy washers and ironers, has changed its name to Easy Washing Machine Corp., to avoid confusion and to take advantage of the cumulative effect from the intensive advertising of the name "Easy".

SCHLEICHER & Co., Inc., has moved its San Francisco office to 79 McAllister St., where enlarged sales, display and exhibit rooms have been prepared.

NATIONAL Electrical Mfg. Assn. headquarters now are in the R.C.A. building, 570 Lexington Ave., New York City.

H. R. CURTISS Co., San Francisco, has been appointed northern California distributor for Eureka vacuum cleaners.

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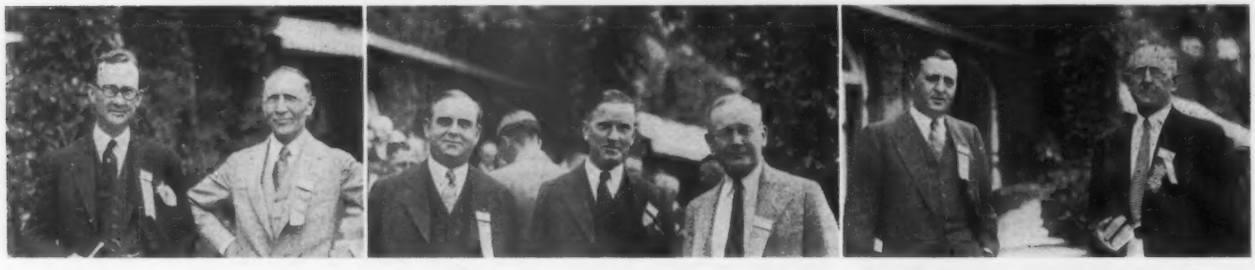
Not a Guilty Conscience in a Cameraload



These conventioneers were not at all afraid of the roving cameraman at the P.C.E.A. annual meeting in June, so we are able to present:(left to right) L. A. Nott, San Francisco district manager, Sangamo Electric Co.; J. G. Monahan, Los Angeles district manager, Sangamo Electric Co.; Oliver R. Grant, General Cable Corp., San Francisco; W. R. Lynch, Los Angeles manager, Aluminum Co. of America; C. F. Benham, Pacific Gas and Electric Co.; A. A. Barbera, Electrical Engineering Sales Co., southern California distributors for Weston Electrical Instrument Co.; and "Dick" Northmore, Los Angeles Gas and Electric Corp. Those boxes in Mr. Northmore's hand are supposed to contain prizes, but Mr. Barbera, being a master magician, has replaced them with eggs or half-dollars

Electric Cookery Chiefs Named

Among the divisional directors appointed by the National Electric Cookery Council are M. L. Hibbard, vice-president and general manager, Idaho Power Co., who heads the Northwest Division; W. L. Frost, vice-president, Southern California Edison Co., who heads the Pacific Coast Division; and W. N. Clark, president, Southern Colorado Power Co., who will direct Rocky Mountain activities. A sufficient number

M. L. HIBBARD

of operating sponsors will be appointed by these men within each division, so that the territories will be blanketed. The organization will resemble closely that for the refrigeration drive.

Under the present plans, organization work will have been completed by March 1, 1933, and a barrage of national consumer advertising will be released soon after. The plan book will appear within the month, it is indicated.

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General Cable Will Market New Product

Under a license agreement with the Thiokol Corp., Yardville, N. J., General Cable Corp. will market a cable, the jacket of which is said to have all the advantages of rubber, but is far superior to rubber itself in resistance to chemical action, fatigue, sunlight, oil, vibration and corona.

Development work already is in progress to complete the adaptation of Thiokol to power cables, overhead conductors and secondary network conductors. It also will be employed for wires put to general industrial uses, where rubber is subjected to the deleterious influences of oil, acid, weather or light.

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G.E. Supply Takes Over Ranges, Refrigerators

Appointment of General Electric Supply Corp. as exclusive distributors for General Electric refrigerators and Hotpoint ranges and water heaters for the Pacific Northwest, effective August 15, has been announced by D. E. Harris, vice-president of G.E. Supply, following a trip to that territory during which arrangements for the change were completed.

Under the new setup, the supply corporation replaces Gordon Prentice, Inc., in the Seattle territory, and the Laidley Co., in the Portland and Spokane territories.

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J. S. SAYRE, general sales manager of Kelvinator, Inc., Detroit, spent the past month on a contact trip to distributors on the Pacific Coast. Speaking in Portland, he said that the Kelvinator company, now in its 18th year, is shipping some 150,000 units annually from the factory. Less than 40 per cent of the families of the United States, he said, use any sort of refrigeration, ice or automatic.

CHARLES R. MUSLADIN now is direct factory representative for Chicago Flexible Shaft Co., covering Oregon, Washington and Idaho.

H. A. HAMMOND, formerly of the Los Angeles office of Appleton Electric Co., has been transferred to Seattle to become Northwest representative for that company.

GEORGE A. GRAY Co., Pacific Coast representative for Wiremold Co., Hartford, Conn., has moved into larger quarters at 1274 Folsom St., San Francisco.

CHARLES FLETCHER recently has been appointed sales manager for the Aldor Corp., of Chicago, manufacturers of electrical appliances and supplies.

J. G. CORRIN, Los Angeles manufacturers' representative, has been named California representative for Davey portable balancing equipment, manufactured by Electrocon Corp., New York City.

CHAS. CORY Corp., New York City, manufacturers of Cory interlock equipment, has appointed Fred W. Carlson, Seattle, as Oregon and Washington representative.

WESTON Electrical Instrument Corp. has named Eicher & Bratt, Seattle, as district representatives for the consolidated Weston-Jewell instrument line. Graybar Electric Co. continues as associate representatives in this territory.

JAMES H. BLINN Co., Denver, has been appointed representative for the Okonite Co. in that district.

FRIGIDAIRE SALES Corp. has opened a new Seattle headquarters at 902 First Ave., South, with offices, a sales and display room, and a service and parts department. C. J. Allgood is manager.

E. G. HALL, formerly headquartered in Portland to cover the Northwest for the construction division of the General Electric Merchandising Department, Bridgeport, Conn., has been transferred to the Los Angeles office. J. O. Dillingham, who has been in charge of this division in northern California, now will have supervision on all construction materials sales in both northern California and the Northwest.

J. R. Tribe Wins National Audition

JUNIUS R. Tribe, salesman in the Ogden, Utah, division of Utah Power & Light Co., was declared winner of the national General Electric refrigeration sales audition contest held on Aug. 1 at Cleveland. His prize was a trip to Boston, Washington, D. C., Niagara Falls, New York and Schenectady, and a cash award of $250.

Paired with Mr. Tribe as a western district winner was Don McBride, L. H.

JUNIUS R. TRIBE

Bennett Co., Sacramento, Calif., who also placed well in the national finals, where seven district winners competed.

Both won the right to compete at Cleveland after winning local, state and district elimination contests, in which nearly every G.E. refrigerator salesman entered. The contest required the delivering of a sales presentation covering the outstanding features of the G.E. refrigerator.

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Pyrex Suspension Insulators Soon Available

According to W. H. Taubert, sales manager, insulator division, Corning Glass Works, suspension-type insulators of "Pyrex" are planned for regular production soon and probably will be available early next year.

These units will be of the usual 10-in. disk type and will be made in both the clevis and ball-and-socket designs, with either drop-forged or malleable hardware. The hardware will be assembled to the body with alloy, eliminating cement.

Field tests are said to have indicated the ability of this insulator to withstand power arcs to a remarkable degree.

Market Review

California and Intermountain—

A BETTER tone throughout the Coast electrical industry was caused at midyear by the fact that business over the greater part of this area was running on an even keel. Since then it actually has shown a slight though appreciable upturn.

Representatives of maintenance lines claim that their sales show a marked increase, proving that industrials are overhauling idle sections of their plants and expanding their operations.

Machinery sales confirm this claim, largely consisting of such items as a $5,500 mechanical drive GE turbine for an oil company; oil motors and cable, value $1,500, for a New Mexico engineering job; GE pumping motors, value $3,000; and a 50-kw. generator, value $1,500, for a gas engine manufacturer.

Power company orders for machinery are practically non-existent, however, and the market for transformers and meters is very quiet. Nearly all utility orders cover stock items of hardware for maintenance or for a few local extensions. The cause is attributed to decrease in heavy industrial, mining and agricultural loads, for although crops are heavier than of recent years, due to favorable growing conditions, marketing prices are so low that, to avoid actual loss, crops in several areas will not be shipped.

Other basic industries, such as lumber in the Northwest, are being rapidly stabilized, with rising hopes for an early improvement. Copper in Montana and silver in Idaho are quiet, Utah copper is improving, and California gold mining is the one bright spot in the picture.

Holiday buying prospects look more favorable at this time than for several seasons, for San Francisco and Los Angeles department stores report more customers, possibly through the buoyant effect of conventions and games, and August is increasing this momentum. Furthermore, many manufacturers are announcing new lines and items with the unusual effect and 1932 slogan of lower prices and increased consumer appeal, such as washers, radios, hollowware and small socket appliances.

Prices in general have been steadier than for several months past, especially in the steel items. The recent 33⅓ per cent drop in the size of the standard buying unit for schedule material is offset so far as volume is concerned by many new counter or merchandising table items such as taps, cord sets and feed-through switches. However, rubber-covered wire prices unexpectedly dropped 15 per cent early in the month, putting the nets down to almost record low figures, but much business has been booked in expectation of an early rise.

Several good rewiring or remodeling jobs are reported in the larger office buildings, such as $7,500 of work in larger feeders and risers for a San Francisco building and a survey of downtown Oakland for modernization plans. In fact, contracting business is again assuming its rightful place in the construction picture, despite building permit volume decreases averaging about 50 per cent for the first 7 months of 1932 compared with 1931. With easier money conditions and a slight increase of bankers' optimism, much dammed-up building will be released.

Pacific Northwest—

CONDITIONS in the electrical business in the Northwest showed no particular improvement in August, with the exception of the movement in small appliances; the increase in these sales was very satisfactory.

Very little industrial business showed during the month and prospective business with the larger lumber and paper mills did not materialize. Some pump and motor sales to U.S. Reclamation Service at Wapato, Wash, in excess of $20,000, are in the immediate offing, it is said. The central station movement, at a minimum, was confined to a few small distribution transformers and meters.

Favorable crop reports, renewed mining activity and the gradual re-opening of the lumber mills and logging camps has promoted a feeling of optimism. Also, the number of inquiries from larger industrials contemplating improvements and expansions is influencing this opinion.

Contract for the Seattle Marine Hospital transformers (seven 150 kva. and one 75 kva.) has just been awarded.

Liberal credit is being extended, with collections from 60 to 90 days; stocks are in excellent condition with replenishments easily obtainable.

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Barometer

WESTERN industrial activity declined 3 per cent from June to July. However, a moderate decrease is usual at this season; in 1929 and 1931, it was 4 per cent; in 1930, it was 5 per cent. The decline this year, thus, is smaller than in any of the preceding three years.

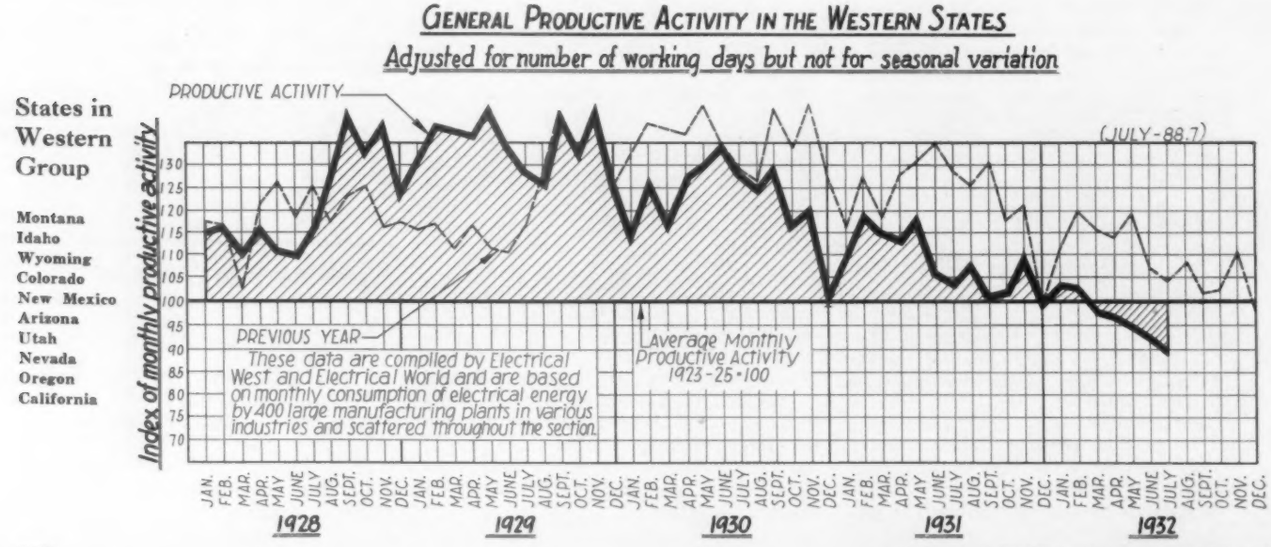
The present level is down 15 per cent as compared with 1931.

Indexes of Manufacturing Activity in the Western States

(All figures adjusted for number of working days)

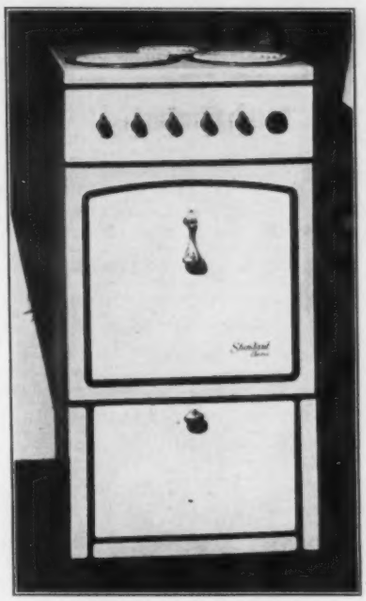
	July, 1932	June, 1932	May, 1932	July, 1931
All industry	88.7	91.6*	94.3	104.0
Chemicals	88.7	85 5	90.1	87.8
Food	112.5	112.4*	115.3	135.3
Forest products	103.8	106 3*	117.0	126.0
Metals group	31.7	44.5*	36.2	47.8
Paper and pulp	120.0	128.7	143.0	101.8
Rubber	103.0	132.0	100.7	146.0
Shipbuilding	103.3	105.0	102.5	77.8
Stone, clay and glass	79.3	72.0*	79.1	115.5

* Revision.

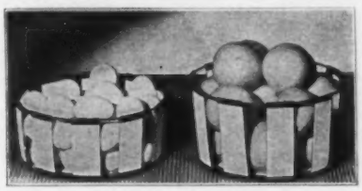


New Products

Standard Ranges



New range models being placed on the market by Standard Electric Stove Co., Toledo, Ohio, include Model 422 A (shown); 422 B, same with short legs and small drawer at bottom; and 422 C, without legs. They are for small kitchens and have three 8-in. burners with one Speed-Heet. The 16-in. oven contains broiler pan and rack. Two new ranges in the "1200" series have four burners, or three burners and a unit cooker. Plate warmer and switch panel are concealed behind doors on No. 1237 and switches are not concealed on No. 1238.



Another product of the same company is the Egg-O-Fruit basket, made of iron and enameled with white, chipless porcelain. It is for holding eggs, fruit, vegetables or cold meats in refrigerators.—Electrical West, Sept. 1, 1932.

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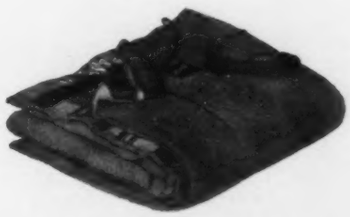

Electric Blanket

Hewitt Electric & Mfg. Co., Arlington, Mass., announces a light-weight, 60 x 80-inc., electrically-warmed blanket of zuni-brown eiderdown. The blanket has one heat, 100 watts, and is thermostatically protected. Manufacturers claim that wetting by rain or snow does not injure the piece. Intended retail price, $15.—Electrical West, Sept. 1, 1932.

Universal Appliances

Two table appliances being introduced by Landers, Frary & Clark, New Britain, Conn., are the Electrovac coffee maker and a two-slice toaster. The coffee maker has a bottom bowl of metal and coffee is drawn from a faucet, obviating the removal of the top bowl. Furnished in three sizes (7, 10 and 14 cups). Prices from $14.50 to $18.50. The toaster is lever-operated to deliver toast free from the oven. Toasts both sides of two slices at once. Chromium plated, price $16.50.—Electrical West, Sept. 1, 1932.

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Kitchen Notifier

This new electric clock, just added to the Sunbeam Eternatime line, made by Chicago Flexible Shaft Co., Chicago, performs two functions: It tells time, and it has a notifier feature by which a housewife may set a red-tipped pointer for any period from one minute to three hours; at the end of that time it rings an alarm. Furnished in green, ivory or white lacquer.—Electrical West, Sept. 1, 1932.

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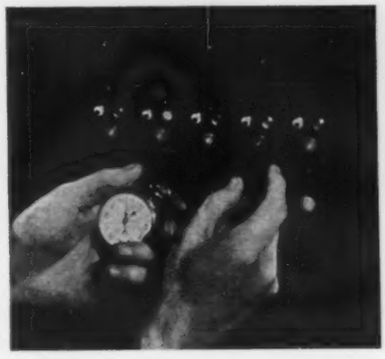
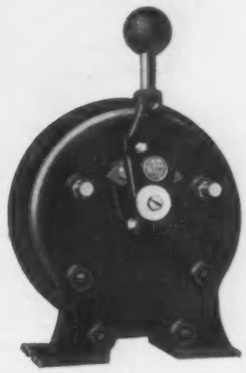
Polaricode

A new supervisory control which is said to permit the selection and operation of the control circuits of any piece of remotely controlled apparatus in less than a second is offered by Westinghouse Electric & Mfg. Co. under the name "Polaricode." The 2-wire type controls up to 25 remote apparatus units and the 4-wire type up to 2,500 units; both are suitable for practically any application where such control is required.—Electrical West, Sept. 1, 1932.



Master Switch

The Electric Controller & Mfg. Co., Cleveland, Ohio, is building a master switch, known as type NX, to regulate control circuits of a magnetic controller. It is designed for use where a maximum of three points of speed control in either direction is required. Features are a Lynite aluminum frame, quickly renewable contact segments, design of wearing parts so they can be replaced from the front.—Electrical West, Sept. 1, 1932.



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Ironer Conversion Unit

Hurley Machine Co., Chicago, announces an ironing machine conversion unit, consisting of a base and a motor, for changing Thor attachment ironers, operated on the wringer post of washers, into portable table-top ironers. Five minutes is required for the conversion. Only three screws are required for fastening the attachment ironer to the drive unit.—Electrical West, Sept. 1, 1932.

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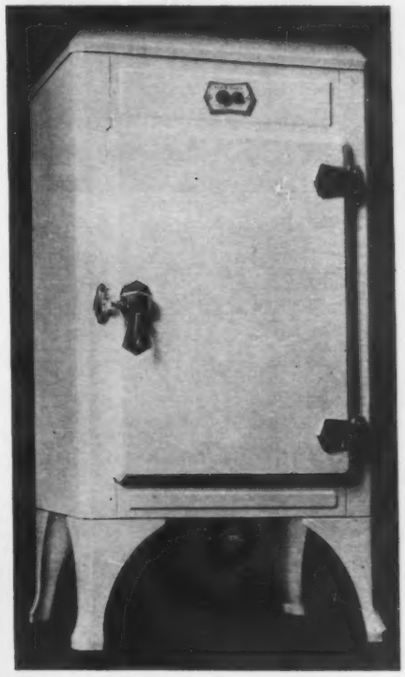

Gibson Refrigerator

Gibson Electric Refrigerator Co., Greeneville, Mich., offers Model SG-54, a family-size refrigerator with a 5.4 cu. ft. content, 9.22 sq. ft. shelf area and a capacity of 63 ice cubes. Regular features of other Gibson models are included. List price, $169.50, f.o.b.—Electrical West, Sept. 1, 1932.

New Bowie Ammeter

Bowie Switch Co., 815 Tennessee St., San Francisco, has developed the Shoemaker fixed-gap testing ammeter for transmission line, distribution system, transformer loading, bare or insulated wire applications. Has no connections, moving parts or wires. Comprises a shielded dead-beat meter on a magnet frame, with a fixed gap through which conductor is inserted. Standard instrument has double scale, 100 and 400 amp, full deflection. Special meters with different ampere ratings and gaps can be supplied. — Electrical West, Sept. 1, 1932.

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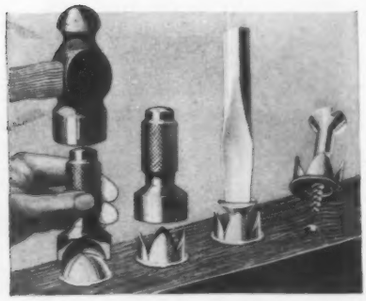
Rawl-Anchor

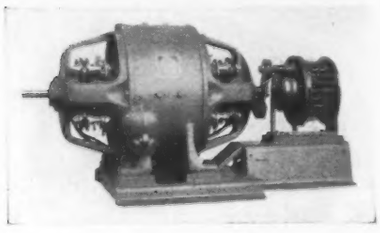


The Rawlplug Co., Inc., New York City, has introduced the Rawl-Anchor, a one-piece, heavy duty, double-expanding masonry anchor for bolts. Either end may be inserted in the hole and only one caulking operation is needed. Ductile aluminum collars spread upon being caulked and completely seal the hole; the bolt will not turn in the hole as the bolt head imbeds itself in the aluminum collar.—Electrical West, Sept. 1, 1932.

▼

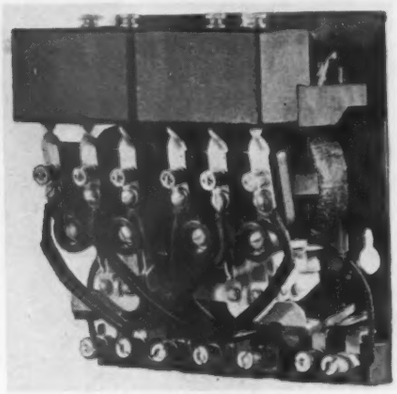
Constant-Tension Regulator

For use with reels for winding strip steel, copper or brass; winders for paper or cloth; and other similar applications, The Reliance Electric & Engineering Co., Cleveland, Ohio, has developed a constant-tension regulator. This regulator eliminates the need for a slipping clutch in such work, where the pulling tension must be constant.—Electrical West, Sept. 1, 1932.



Reversing Magnetic Contactor

A new 3-pole reversing magnetic contactor, interchangeable in rating and dimensions for a.c. or d.c. currents, has been developed by Industrial Controller Division, Square D Co., Milwaukee, Wis. Maximum rating, 3 hp. Compact design, small dimensions and convenient wiring arrangement make it adaptable for hoists, window and door control, dumb waiters, reversing machine tools and similar applications. Arranged for either 2-wire or 3-wire control. — Electrical West, Sept. 1, 1932.



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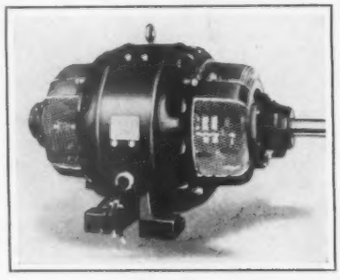
Self-Syn Motors

Ideal Electric & Mfg. Co., Mansfield, Ohio, announces a synchronous motor which has been developed for industrial and general purpose applications. Known as the Ideal Self-Syn motor, it is described as a self-excited, self-synchronizing, self-contained motor unit that requires no external excitation. It is started with a simple, hand-operated conpensator and automatically re-synchronizes itself after being pulled out of step by a line voltage drop or a momentary overload.—Electrical West, Sept. 1, 1932.



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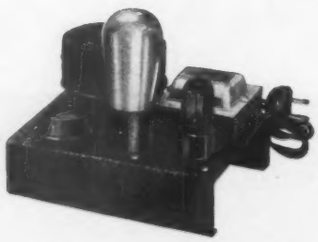


Photoelectric Relay

A new, low-cost photoelectric relay, the Fotoswitch of the G-M Laboratories, Inc., Chicago, embodies an electro-magnetic switch which is opened or closed by a photoelectric cell. This is a junior model of other industrial-type photoelectric relays offered by the company, and comes with every essential operating part mounted in a black enamel case.—Electrical West, Sept. 1, 1932.

Trade Literature

¶ PORTABLE PUBLIC ADDRESS SYSTEM — Western Electric Co., New York City, has a 12-page booklet describing the portable public address system developed by that company. The system is contained in a carrying case, weighs about 70 lb, has an amplifier with a gain of 71 decibels.

¶ WAGNER BULLETINS—Wagner Electric Corp., St. Louis, has issued two booklets, one on air-cooled transformers and one on multi-speed, squirrel-cage motors. Both are illustrated, describe applications of the equipment.

¶ CHROMIUM STEEL TUBES—"Four to Six Per Cent Chromium Steel Tubes and Pipe" is the title of a 16-page bulletin just issued by Babcock & Wilcox Tube Co., New York City. It presents, technically, the advantages of this steel for refinery and other services.

¶ WORTHINGTON RELEASES—Several publications have been issued by Worthington Pump and Machinery Corp., Harrison, N.J., on: Portable compressors and contractors' air tools (W-850-B8); rock drills (W-1201-S1A); hydraulic by-pass and check valves (D-445-S2); power pumps for marine boiler feed service (D-423-S14); steam pumps for marine service, vertical simplex type (D-121-S2, for pressures to 350 lb., D-121-S1, for pressures to 600 lb.); and steam pumps for highly volatile liquids (D-111-S4).

¶ VACUUM TYPE TERMINATORS — Bulletin 65-AC, of Delta-Star Electric Co., Chicago, describes and lists vacuum type single and multiple conductor terminators for indoor service.

¶ KORTICK CATALOG — Kortick Mfg. Co., San Francisco, is issuing catalog No. 32, which lists the pole line hardware and specialties manufactured by that company.

¶ INDUSTRIAL RUBBER GOODS — Containing engineering data and information never before published, with a simplified listing of principal industrial rubber products, a new catalog is being distributed by The B.F.Goodrich Rubber Co., Akron, Ohio.

¶ APPLETON PRODUCTS — Bulletin 1001, of Appleton Electric Co., Chicago, supplements catalog No. 10 and includes listings of outlet boxes, switch boxes and miscellaneous conduit fittings not in the catalog.

¶ COUNTESS RANGES—Describing the complete line of Countess ranges, a catalog is now being distributed by Electrical Manufacturers, Inc., Alliance, Ohio, a reorganization of the former William Campbell Co.

¶ WIREMOLD—In the latest Wiremold Co., Hartford, Conn., price sheet (No. 1-LS), a new addition to the Wiremold line, Wiremold Lighting Strip, is described and illustrated.

¶ LIFTING MAGNETS — In an illustrated, loose-leaf booklet of 16 pages, The Electric Controller & Mfg. Co., Cleveland, describes its line of lifting magnets.

¶ SUPERHEATERS — Bulletin T-22 of The Superheater Co., New York City, discusses the economies made possible through the use of superheated steam and illustrates and describes the new Elesco horizontal return tubular superheater.

¶ ACME CATALOG — Acme Electric Heating Co., Boston, is distributing catalog D, listing the company's line of electrical and industrial materials, electric heating appliances, etc.

¶ G.E. PUBLICATIONS—Recent publications of General Electric Co., Schenectady, include the following:

GEA-1628: Squirrel-cage motors.
GEA-1582: Shipped-assembled switchgear.
GEA-1619: Splash-proof motors.
GEA-1599: Supervisory systems.
GEA-897B: Air-cooled transformers.
GEA-1586: Electric equipment for wood-working.

¶ WESTINGHOUSE PUBLICATIONS — Recent releases of Westinghouse Electric & Mfg. Co., East Pittsburgh, include:

A-61355: Transformer tap changers.
A-61356: Inertaire equipment for transformers.
A-61357: Transmission line protection, de-ion principle.
A-61393: Electric hotbeds, propagation work with controlled electric heat.

REPORTS AND APPRAISALS

combined with extensive
CONSTRUCTION EXPERIENCE

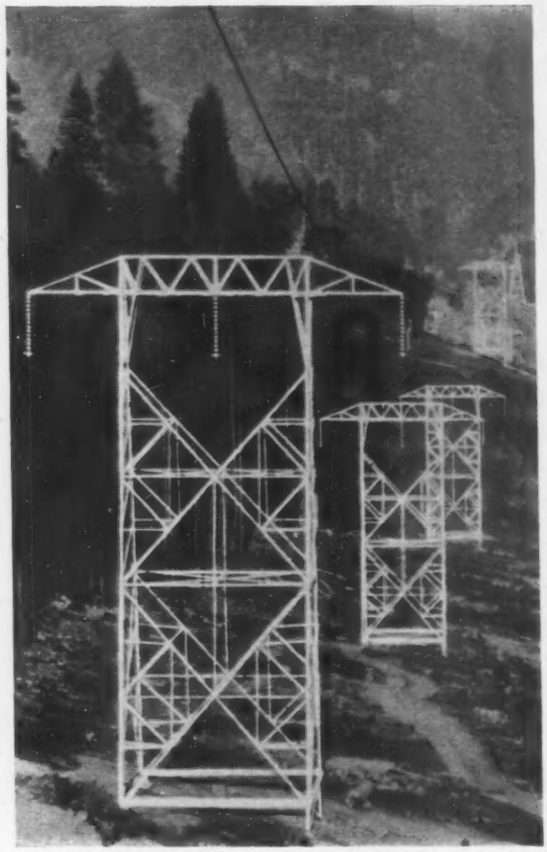
In addition to our extensive engineering and construction work, we have been making reports and appraisals for 40 years. This combined experience of the engineer and the business man is proving of value in assisting banking, industrial, and utility concerns in problems peculiar to this business period.

This experience may be of value to you. A talk with us will place you under no obligation.

STONE & WEBSTER
ENGINEERING CORPORATION

A SUBSIDIARY *of* STONE & WEBSTER, INCORPORATED

SEATTLE	SAN FRANCISCO	LOS ANGELES
Skinner Building	Russ Building	Edison Building



Transmission Structures of STEEL

Transmission Structures built of Steel are economical to erect and to maintain. They insure a degree of safety and of freedom from the possibility of service interruptions that cannot be obtained with any other material. They are highly dependable for supporting transmission lines over long or short distances, and under all conditions.

Pacific Coast Steel Corporation has had wide experience in the design and fabrication of all types of steel transmission structures. If you are planning a transmission line, our engineers will gladly study all the conditions and recommend supporting structures of the most suitable type.

PACIFIC COAST STEEL CORPORATION

Subsidiary of Bethlehem Steel *Steel Corporation*

General Offices: San Francisco

District Offices: Seattle, Portland, Los Angeles, Honolulu
Export Distributor: Bethlehem Steel Export Corporation, New York

PACIFIC COAST STEEL
CORPORATION

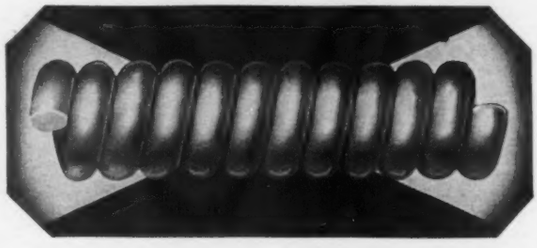
DEPENDABILITY

— Since 1923 —

THE DEPENDABILITY OF JEFFRIES TRANSFORMERS IS BEST TOLD BY THE YEARS OF SATISFACTORY SERVICE BEHIND THEM

Jeffries Transformer Company

5706 Long Beach Ave., Los Angeles, Calif.
Electric Agencies, 2059 Webster St., Oakland, Calif.



Galvanized Telephone Wire and Steel Strand

Crapo Galvanized Wire can be wrapped around its own diameter without injury to its pure zinc coating....That is one of a number of reasons why **Crapo** Galvanized Telephone Wire and Strand can be depended upon to reduce maintenance cost.

Look for the **Crapo** Seal!

Indiana Steel & Wire Co.
Muncie, Indiana

Crapo
GALVANIZED PRODUCTS

Here is a brief statement of the ELECTROTRIM facts

and the bigger opportunities for the increased sale of electricity to the home and office

What it is—

ELECTROTRIM is made of rubber covered standard No. 14 stranded wire enclosed in a stitched covering of high quality insulating material which is flame proof, waterproof, tough and durable. ELECTROTRIM is the answer to the demand for a safe, modern electrical wall outlet to replace dangerous, unsightly cords straggling around the room.

ELECTROTRIM lies flat and can be carried snugly around corners. It is easily applied with standard 6 oz. flat head tacks or special fastener, the heads of which are concealed under the center bead. ELECTROTRIM and its fittings are finished in four beautiful colors—(white, oak, ivory, mahogany) to harmonize with interior wood trim, walls, or ceiling.

EASY TO SELL

The demand for ELECTROTRIM does not need to be created—IT IS HERE. Homes and offices want this new convenient extension wiring. To show ELECTROTRIM is to sell it. ELECTROTRIM sales and merchandising plans include a free display rack which holds and displays 300 ft. of ELECTROTRIM in 3 assorted colors, a free display board showing the actual use of ELECTROTRIM and its fittings, and advertising folders giving the utility and contractor an easy demonstrating and easy selling item.

Quick Facts

Approved non-metallic 2-wire extensions now permitted by Electrical Committee of N.F.P.A.

•

ELECTROTRIM, the outstanding 2-wire non-metallic extension meets the tremendous existing demand for low cost electrical wall outlets.

•

Not a substitute for concealed wall outlets. Intended for surface extensions only. A new source of income for electrical contractors and revenue for Central Stations. More convenience outlets mean more load and bigger revenue.

•

Increases sales of electrical appliances by making the needed additional wall outlets inexpensive.

A Tremendous Market

Practically every home and office in America needs and will buy ELECTROTRIM. For ELECTROTRIM not only meets the modern demand for harmonious room decoration, elimination of unsightly lamp cords and more numerous wall outlets BUT is so moderate in price that all can afford to specify it.

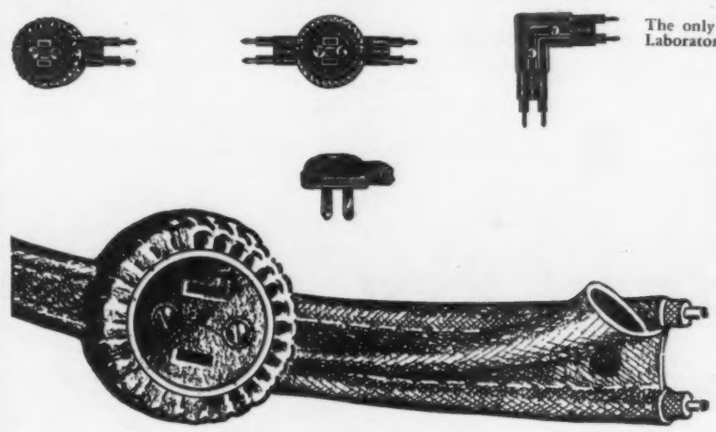
Priced right to sell a waiting market of more than 20,000,000 homes and offices that need only to see it to buy it.

Central Station and Contractor Cooperation Will Build Sales

ELECTROTRIM offers a new and unusual opportunity. It presents countrywide possibilities in added revenue for Central Stations and profits for Contractors. Full cooperation between both of these sales and installation agencies is necessary.

Central Station experience is a valuable factor in the development of the market for ELECTROTRIM, as is the initiative of Contractors. It is therefore but a matter of hand in hand effort for the successful and profitable introduction of ELECTROTRIM to homes and offices everywhere.

In addition to the sale of ELECTROTRIM you sell more wall outlets and in so doing create new markets for more electrical appliances. Now is the time for action—immediate results will follow.



The only non-metallic surface extension wiring approved by Underwriters Laboratories.

Special Introductory Assortment Details to those who return the COUPON NOW

ELECTROTRIM, Inc.,
Dept. WE, Union City, Ind.

With the understanding that there is no obligation, rush me ELECTROTRIM samples, prices and details of your cooperative plan for Central Stations and Electrical Contractors.

NAME .....

ADDRESS .....

CITY .....State.....

"Why, your salesman never calls on us now!"

"One of our best and oldest customers had just purchased some new equipment from a competitor because 'Why, your salesman never calls on us now!' He was really quite pleased to learn from me that we were still in business and was sorry that we had not been on the job to 'figure on his equipment'."

Those are the actual words of the sales manager of a national manufacturer. And they aren't unusual, either, because day after day we hear similar stories of lost sales. . . the tune always is the same.

It takes longer to make a sale these days. More calls . . . more time at each call spent in convincing the buyer of the need for and superiority of any particular product. With sales forces reduced as they are, it is almost impossible for a salesman to call on all his prospects.

One of advertising's jobs is to keep your salesman on the job — so there will be no "I thought you were out of business!" alibis. Each call that an advertisement makes releases your salesman for a different call. And if markets are spread thinly today, your salesman needs to cover them all.

Give him the help he needs. Open up his prospect list with well-directed advertisements placed in a publication his prospects read.

Electrical West

A.B.C. » A McGraw-Hill Publication » A.B.P.

Get in Step *with this* Range-Selling Program

BOOST your range sales this fall. Tie up with General Electric's fall and winter campaign on Hotpoint Electric Ranges. This new G-E Hotpoint program brings to a climax the national interest in electric cookery awakened by General Electric's vast advertising and the activities of the National Electric Cookery Council.

Now Hotpoint scores again as the easiest selling electric range. More people know Hotpoint. More people own Hotpoint than all other electric ranges. More people prefer Hotpoint. Make your fall and winter selling effort pay full returns.

Help your salesmen get more range sales from same number of interviews. Concentrate on General Electric Hotpoint range.

General Electric's plan is four big steps ahead in selling electric ranges. Get in step with this range-selling program. Be sure to see the "G-E Hotpoint Christmas Parade" (a new book which explains the plan) before you make any arrangements for fall or winter sales activity.

GOOD RANGE SALESMEN
Get Better
POOR SALESMEN
Get Good
with G-E Home Sales Training Course

The General Electric Hotpoint Home Sales Training Course puts a new weapon in the hands of your range salesmen. Prepared in collaboration with the LaSalle Extension University, this remarkable program is unique in the industry. It tells how to find electric range prospects. Gives certified, sure-fire sales talks. Tells how to overcome objections and how to close the sale. Nothing like it has ever been published before. Learn all about it. Write us today. Get all the details on this specialized home training course.

GENERAL ELECTRIC

ELECTRIC *Hotpoint* RANGE

EDISON GENERAL ELECTRIC
APPLIANCE CO., Inc.
5612 West Taylor Street, Chicago, Illinois

Edison General Electric Appliance Co., Inc.,
5612 West Taylor Street, Chicago, Illinois

Gentlemen:
Please send me the material I have checked.

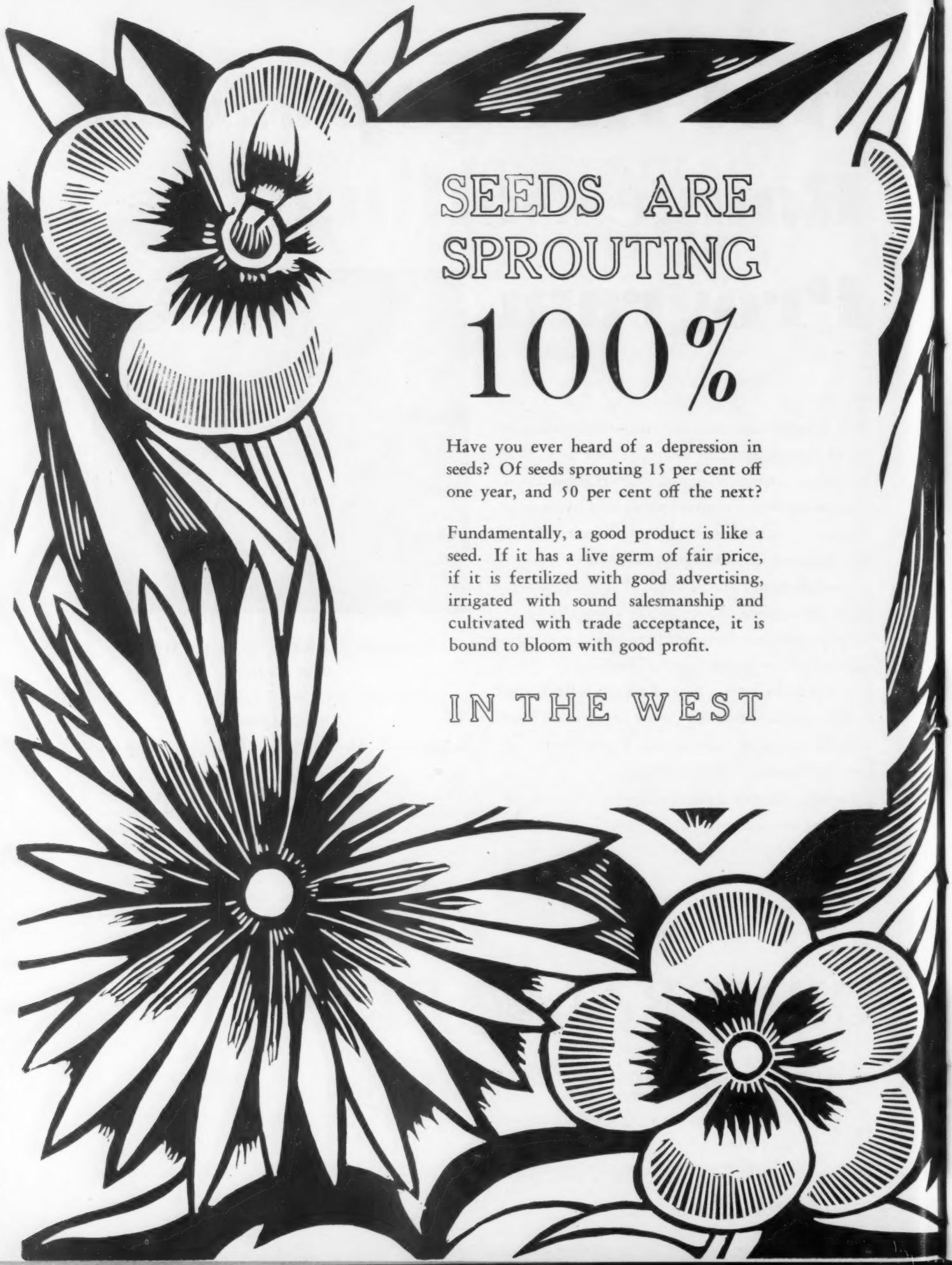
☐ Information on the Fall and Christmas Hotpoint Electric Range selling plan.

☐ Information on the La Salle Extension University-Hotpoint Retail Salesman's Training Course.

Name .....

Street ..... *City* .....

Company .....



SEEDS ARE SPROUTING 100%

Have you ever heard of a depression in seeds? Of seeds sprouting 15 per cent off one year, and 50 per cent off the next?

Fundamentally, a good product is like a seed. If it has a live germ of fair price, if it is fertilized with good advertising, irrigated with sound salesmanship and cultivated with trade acceptance, it is bound to bloom with good profit.

IN THE WEST

For Bumper Crops

plant your Advertising in

ELEVENTH ANNUAL

Load-Building and Merchandising Issue

October 1, 1932

Utility commercial managers are plowing their fields for 1932. Commercial department budgets will be made up in the next month or two. Dealers are planning for stimulated Christmas buying. Engineers are preparing next year's construction budgets. To insure consideration for your products in the West, advertise now in ELECTRICAL WEST.

In the annual October issue, the editors will present a vivid, graphic study of today's most lucrative markets, will discuss market possibilities for next year. Campaigns which have been successful in building load NOW will be described. It will be a forward-looking issue, in tune with the day's opportunities.

Advertise in this issue in spreads and color. Tie in your sales story with this editorial theme—ONLY THE PLANTERS WILL REAP. Forms close in San Francisco on September 20.

ELECTRICAL WEST

A. B. C. -:- A McGraw-Hill Publication -:- A. B. P.

DISTRICT SALES OFFICES

New York City	330 West 42nd Street	St. Louis	1555 Bell Telephone Building
Chicago	520 North Michigan Avenue	Detroit	2-257 General Motors Building
Philadelphia	Commercial Trust Building	Greenville, S.C.	1303 Woodside Building
Boston	1427 Statler Building	Los Angeles	340 Chamber of Commerce Building
Cleveland	501 Guardian Building	San Francisco	883 Mission Street

PROFESSIONAL DIRECTORY

BYLLESBY
ENGINEERING & MANAGEMENT CORPORATION
Wholly-owned Subsidiary of Standard Gas and Electric Company
231 South LaSalle Street, Chicago
New York Pittsburgh San Francisco

ARTHUR R. KELLEY
CONSULTING ENGINEER
Reports and Valuations, Public Utility Industrial Properties
Edison Bldg. Los Angeles

Your card here builds favorable prestige for you. The cost is extremely small. The value is great as a business aid.

ELECTRICAL TESTING LABORATORIES
Electrical Photometrical, Chemical and Mechanical Tests. Inspection of Materials and Apparatus at Manufactory
80th St., and East End Ave., New York

In any line, a specialist does the best job.
Why not consult the firms listed here on your next undertaking?

THE J. G. WHITE ENGINEERING CORPORATION
Engineers—Contractors
Oil Refineries and Pipe Lines, Steam and Water Power Plants, Transmission Systems, Hotels, Apartments, Office and Industrial Buildings, Railroads.
43 Exchange Place New York

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Christmas Cards

ARE NOW ON DISPLAY
MORE BEAUTIFUL THAN EVER
AT TODAY'S NEW LOW PRICES

Electrical West is from the press of Neal, Stratford & Kerr

NEAL, STRATFORD & KERR
STATIONERS -:- PRINTERS -:- ENGRAVERS
521 Market St. SAN FRANCISCO 1169 Russ Bldg.

Bound Volumes

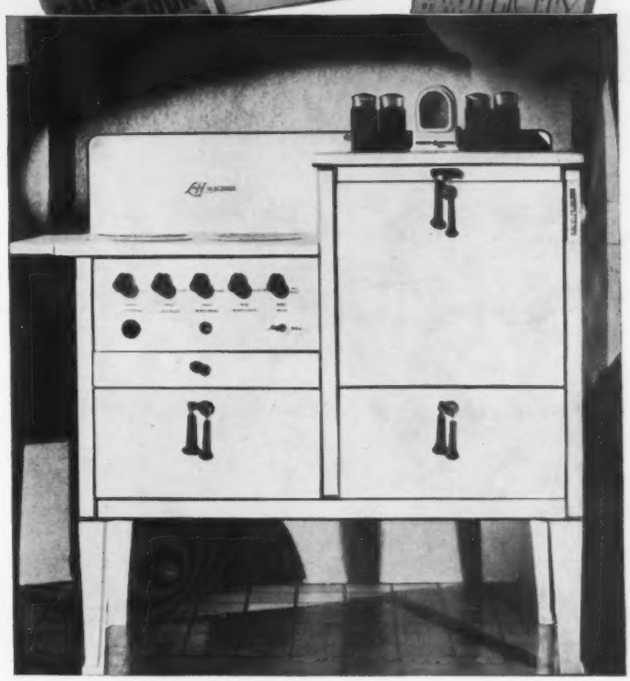
FOUR BOUND VOLUMES, containing issues of Electrical West from January 1 to June 1, 1932, inclusive, may be purchased by calling at or writing to the office listed below. These volumes are half-bound in red leather, gold lettered, fully indexed. They are suitable for libraries, either private or company, and may be had for $7.50 each.

ELECTRICAL WEST
883 Mission Street . . . . San Francisco

Resale Helps that Really *Help*

make L&H *ELECTRIC RANGES*

Easier to Sell



Not only a superlative line of electric ranges to talk *about*... but also a carefully planned manual to talk *from*...

An illustrated booklet, with recipes and instructions, to leave with the prospect...

Plates, showing each range in true colors...

A salesman's illustrated handbook, giving a complete course in the selling of *L&H* Electrics...

An *L&H* catalog, giving complete specifications of the entire line...

All in a handsome, compact, durable ring binder.

You have only to *see* this handsome kit to *know* it will make it easy to sell *L&H* Electric Ranges.

There are some desirable territories still available. Mail the coupon for information.

A. J. LINDEMANN & HOVERSON COMPANY... MILWAUKEE, WISCONSIN

2626 W. Washington Blvd.....Chicago, Ill.
136 W. 42nd St.....New York, N. Y.
715 Bryant St.....San Francisco, Cal.

L&H *Advanced*
ELECTRIC RANGES

P. F. Ross, 715 Bryant St.....San Francisco, Cal.
Thompson & Holmes, Ltd., 171 Bluxome St.....San Francisco, Cal.
North Coast Elec. Company.....329 Everett St., Portland, Ore.
Brown-Johnston Company.....Spokane, Wash.
Ungar & Watson, Inc., 1363½ So. Figueroa St.....Los Angeles, Cal.
Intermountain Electric Co.....Salt Lake City, Utah
North Coast Elec. Company.....206 3rd Ave. So., Seattle, Wash.
Yakima Hardware Company.....Yakima, Wash.
J. R. Bradley Co.....Reno, Nevada

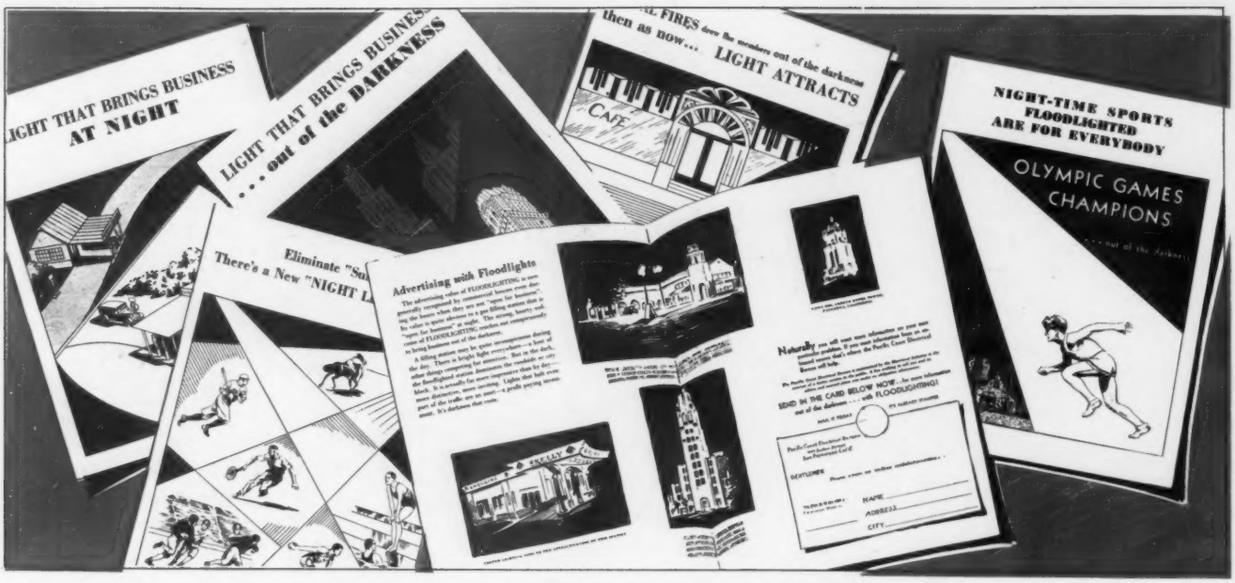
A. J. Lindemann & Hoverson Company,
607 W. Cleveland Avenue, Milwaukee, Wisconsin

I am interested in selling L&H Electric Ranges.

Name.....

Town.....

State.....



"Out-of-the-Darkness—with Floodlighting" Mailings Made by the Bureau

Floodlighting Helped U.S. Break World Records

The part that floodlighting played in shattering world records at the Xth Olympiad can be accredited not alone to performances made by the contestants under adequate lighting conditions during that event itself, but to previous valuable training hours in small towns and cities where present Olympic stars had opportunities to develop their ability by lengthened recreational hours—*made possible by night-time sports illumination.*

In promoting sports lighting, stress should be placed upon both the public spirited attitude toward increasing activities ordinarily enjoyed in the daytime by a limited few, as well as the more practical standpoint that *floodlighting will pay.* Wherever floodlighting has been installed, profitable gate receipts have come from a different public than would, or could attend daytime events.

The Lighting Committee of the Bureau has done an excellent job in creating interest in out-door illumination for football, baseball, polo, swimming, tennis and other sports. The committee is active, too, in putting over the use of floodlighting and spotlighting for playgrounds, beaches, golf courses, commercial structures, industrial plants, residences and gardens.

A series of attractive mailing pieces on various out-door lighting subjects for general utility, advertising, identification and property protection have been recently produced by the Bureau, and are being mailed to a list of over 3500 city officials, building owners, industrial executives, service station groups, etc., inviting their application for free wiring diagrams, special information, and lighting plans on their own particular problems. Get acquainted with the activities of this committee—use the services of the committee to help you put over out-door lighting installations.

Pacific Coast

ELECTRICAL BUREAU

A non-profit organization supported by all branches of the industry as an advisory bureau to serve impartially all users of electricity

447 Sutter Street, *San Francisco*

Room M. 15 Edison Bldg. Los Angeles

848 Roosevelt Street Fresno

ELECTRICITY COSTS SO LITTLE IN CALIFORNIA